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Dairy and Food Sanitation

A Publication of the International Association of Milk, Food and Environmental Sanitarians, Inc.

Beta-Carotene Use in Food

Bacterial Quality of Store Milk

Packaged Fluid Milk Quality

Preventing Adulteration of Milk by Water

Canola Can Replace Soybean Meal in Dairy Herd Rations

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How to Prevent Adulteration of Milk By Added Water

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This paper discusses problems caused by water adulteration of milk and provides a set of strategies that dairymen and bulk truck drivers can use to prevent the unintentional addition of water to milk.

It is illegal to add water to market milk. In addition, it is a serious financial loss to processors and consumers. Even if milk meets minimum total solids, solids-not-fat, and fat levels, it is considered adulterated if water is added. A freezing point upper limit value of -0.525° Hortvet (H) has been established as official for milk and is used for regulatory reference. If the freezing point falls below -0.525°H, it is generally presumed to be free of added water. The freezing point range for normal milk is -0.528 to -0.561°H. No lower limit has been established for the freezing point of milk. Milk quality control laboratories routinely check for the addition of water to milk by measuring its freezing point with an instrument called a cryoscope.

Not only is adulteration of milk with water illegal, but it may lead to keeping quality and off-flavor problems. All groundwater supplies contain some combination of bacteria, chemicals and minerals. The presence of psychrophilic bacteria in water may cause raw milk quality to deteriorate more quickly. Bacteria counts may be in the millions up to the time of pasteurization, because certain types of bacteria introduced with water will grow at refrigeration temperatures. Low levels of iron, copper, or sulfur in water may cause off-flavor development in raw milk. Less than 1 ppm of these minerals can cause a "tallowy" or metallic taste or oxidized flavor.

Situations have changed in recent years whereby water may accidentally get into milk. Mechanical movement of milk by pumping and automatic circulation cleaning permit rather easy entrance of water into milk. It is everyone's responsibility to prevent addition of water to milk.

There are many factors which may contribute to an abnormal freezing point. Usually it is the addition of water whether accidentally or intentionally. To prevent accidental addition of water to milk and to help assure that accurate freezing point determinations are made the following factors should be considered.

How to Prevent Water Adulteration of Milk

There are a number of possible remedies a dairyman should consider doing if it is determined that milk from his dairy has been adulterated with water. For example:

a) *Disconnect Discharge Pipe* - Do not chase milk out of the pipeline milker with water, regardless of any previous advice to do this. Before rinsing or sanitizing the pipeline be sure the pipe from the pipeline milker discharges into the sink or drain. Installation of a micro switch on a pipeline milker can help prevent rinsing or washing while the discharge pipe is in the bulk tank.

b) *Check Pipeline and Equipment Drainage* - The Pasteurized Milk Ordinance requires that milking systems be properly installed to permit good drainage. To assure adequate drainage and drying, pipeline joints and gaskets should have a relatively smooth inner surface; slopes for permanent lines with couplings should be at least 1-1/2 inches per 10 feet.

Automatic milker detachment devices are of particular concern. Extra feet of plastic tubing are required for this equipment and adequate drainage

from this tubing may not always occur. For this reason, plastic tubing more than 10 feet long should be dried with forced hot air. This prolongs the useful life of the plastic by preventing moisture absorption and the subsequent cloudy or opaque appearance.

c) *Dry teats* - Following pre-milking sanitation, use a single service paper towel to remove excess water (as well as sediment and bacteria) from teats and udder. The use of single service paper towels for this purpose is required by the Pasteurized Milk Ordinance.

d) *Sanitize Teat Cups When Vacuum is Off* - Do not dip teat cups in water or sanitizer unless the vacuum is off. (Close a positive valve in the milk line).

e) *Rinse Bulk Tank Exterior Carefully* - Do not rinse off the top of a bulk tank containing milk with a hose. Water may splash under the covers or porthole lids. Use a sponge or paper towel.

f) *Leave the Bulk Tank Valve Open* - After washing and sanitizing the bulk tank allow these solutions to drain out before adding milk.

g) *Consider Effect of Hot Weather* - The freezing point of the milk produced during hot weather rises slightly. Thus determinations of water adulteration of milk during hot weather should be evaluated carefully.

Some Factors that Don't Alter the Freezing Point of Milk

Dairy cow nutrition, disease and a number of other factors generally have little impact on the water content of milk.

a) *Cow Nutrition* - Although freezing point varies due to ration, total variation due to type of ration is generally small. As long as cattle have reasonable access to the necessary quantities of feed and water, freezing points stay within acceptable limits. However, milk from cows that have been semi-starved may showed an elevated freezing point: cows that are deprived of water generally produce milk with a reduced freezing point. On the other hand, consumption of large amounts of water can cause an increase in the freezing point of milk.

b) *Other* - A number of other factors including cow health, breed, stage of lactation, time of milking and mastitis have all been reported to have some impact; however, these factors do not have a practical impact on the freezing point of milk.

Consideration for Bulk Truck Drivers

Bulk truck drivers should use proper techniques so as to obtain representative samples of milk:

a) *Agitate Milk* - Milk should be properly agitated before samples are taken to assure that a uniform sample is obtained.

b) *Rinse the Dipper* - The dipper used for collecting milk samples should be rinsed with milk. The recommended procedure is to empty residual sanitizer from the dipper, then fill it with milk and empty it at least twice before collecting a sample.

c) *Keep Sample Container Dry* - Sample containers should be clean and free of moisture. A drop or two of water in large samples of a few ounces or greater is not significant; however, they are of more concern in the one ounce sample widely used for universal sampling programs. For a sample which is near the freezing point standard, a few drops of water may be enough to indicate added water.

d) *Don't Submerge Sample Containers* - Filled sample containers in sample cases should be submerged in water and ice only to the milk line thereby avoiding any possibility for water to enter a sample container.

e) *Disconnect Hose Before Rinsing Bulk Tanks* - Be sure to disconnect the hose from the outlet valve before rinsing the bulk tank.

f) *Rinse and Dry Conveyor Hoses Properly* - Milk or conveyor hoses should drain to the floor. They must be disconnected from the bulk tank during all rinsing and washing cycles. A warm air drier should be used daily on plastic hoses which are more than 8 feet long.

g) *Don't Freeze Milk Samples* - Although refrigeration of milk samples is important, they should not be frozen as this will cause the freezing point to rise and thereby falsely indicate the addition of water to the milk.

There are many other points that bulk truck drivers must consider when taking samples, but these are the ones of greatest importance that relate to the water content of milk.

Milk Quality Laboratory Consideration

Laboratory personnel may occassionally make errors in freezing point determinations. They should also consider carefully how they convert freezing point readings into percentages of added water. This is not a valid procedure because it assumes an average freezing point of all milk. Thus laboratories should double check their results before taking *positive* action to correct and prevent cases of added water in milk.

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History and Introduction

Beta-carotene, or provitamin A, is a naturally occurring constituent of various foods and feeds. When ingested, beta-carotene is converted in the animal body to vitamin A. As food colorants, carotenoids impart yellow to red pigments, and when complexed with protein, green and blue colorations result (Bauernfeind, 1972).

The history of the carotenoids can be divided into four periods (Bauernfeind, 1978). During the first period (19th century), the pigments were isolated and characterized by measuring differences in light absorption. Wackenroder (1831) isolated carotene from carrots. Through the second period (1900 to 1927), the empirical formula was determined by Wilstatter and Meig (1907) and speculation about the photosynthetic role of carotenoids was made. The third period (1928 to 1949) was dominated by the provitamin A concept, establishing the structural formula (Karrer and Helfenstein, 1929) and developing synthetic methods. The latest period (1950 to present), is characterized by industrial synthesis (Isler and co-workers, 1956) and commercial production of beta-carotene. At present, virtually all commercially available beta carotene is chemically synthesized.

Beta-carotene is the carotenoid of highest (100%) vitamin A biologic activity (Bauernfeind, 1972). Plants, bacteria, fungi and some lower animals synthesize carotenes, usually as a derivative (secondary metabolite) of those factors (primary metabolites) responsible for growth and maintenance of the organism (DeLuca, 1978; Burnett, 1968). Deep green leafy and orange to red pigmented vegetables (i.e., mint, spinach, alfalfa, carrots and squash) contain relatively high concentrations of beta-carotene (Table 1). Each of these foods contain an average quantity of greater than 100 International Units (IU) vitamin A activity per gram (Bauernfeind, 1972).

Carotenoid Biogenesis

In nature, acetate is considered the starting compound in the bio-synthesis of carotenoids (Figure 1). Two molecules of acetyl CoA condense to form aceto-acetyl-CoA which in turn

TABLE 1. *Vitamin A activity and occurrence of some carotenoids (Bauernfeind, 1972).*

Carotenoid	Activity (%)	Occurrence
Beta-carotene	100	Green plants, vegetables, carrots, sweet potatoes, squash, tomatoes, pineapples, paprika, cranberries, wheat, corn, palm oil, sorghum, algae, bivalves, eggs, fish, alfalfa
Alpha-carotene	50 to 54	Green plants, carrots, corn, green peppers, apples, peaches, cherries, bananas, bleached paprika, palm oil, chestnuts
β-Apo-8'-carotenal	72	Citrus fruit, green plants, animal tissue, alfalfa, meal, grass
Torularhodin	<50	Yeasts, microorganisms, fungi
Lycopene	Inactive	Tomatoes, carrots, green peppers, pink citrus, apricots, watermelons, microorganisms
Capsanthin	Inactive	Red peppers, paprika
Bixin	Inactive	Annatto seeds

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BETA-CAROTENE: A BRIEF HISTORY, BIOGENESIS AND FUNCTIONS IN FOOD

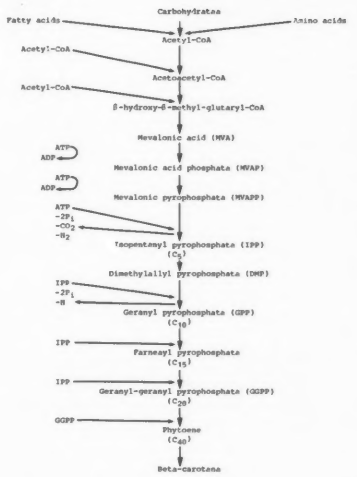

Figure 1. *Biosynthetic pathway for β-carotene (Bauernfeind, 1972).*

condenses with acetyl-CoA again to produce β-hydroxy-β-methyl glutaryl-CoA. (This latter compound can be produced via CO_2 fixation to β-methyl crotonyl CoA, a leucine metabolite [Rose, 1976; Lowry and Chichester, 1971].) Through a reduction step, β - hydroxyl - β - methyl glutaryl-CoA forms mevalonic acid (MVA). MVA, in the presence of adenosine triphosphate (ATP), is converted to mevalonic acid phosphate and is further phosphorylated to mevalonic pyrophosphate (MVAPP). In the presence of ATP and in combination decarboxylation and dehydration steps, MVAPP is converted to the important biological 5-carbon isoprene unit, isopentenyl pyrophosphate (IPP). IPP is first isomerized to dimethylallyl pyrophosphate (DMP) and then IPP and DMP condense to form geranyl pyrophosphate (C_{10}). Continued condensation of this 10 carbon unit with IPP yields farnesyl pyrophosphate (C_{15}). By one more condensation, farnesyl pyrophosphate forms the 20 carbon unit, geranyl-geranyl pyrophosphate (GGPP). Through dimerization GGPP forms phytoene (C_{40}) the basic 40 carbon acyclic carotenoid structure (Bauernfeind, 1978).

There is uncertainty about the pathways for cyclization of the acyclic carotenoids and introduction of the oxygen moiety (Bauernfeind, 1978). Beta-carotene is a molecule containing two terminal β-carotene groups linked by eight isoprene (C_5) units. Deviations from this by oxygenation, hydrogenation or by acyclic terminal groups reduce the provitamin A activity. Vitamin A (retinol) is produced by cleaving β-carotene at the 15-15′ bond and the addition of water.

Functions of Beta-carotene

The functions of β-carotene range from its provitamin A activity to direct and indirect coloring of foods. Vitamin A is essential for animal growth and maintenance. It is necessary for vision, reproduction (maintenance of spermatogenesis and prevention of fetal resorption), bone development and regulation of membrane structure and function (Lui and Roels, 1980).

β-carotene occurs in the adipose sites of fish, meat and poultry. Egg and dairy products also contain carotenoids in the lipid fraction (Emodi, 1978; Bauernfeind, 1973). Efficiency of metabolism and deposition of carotenoids in milk or animal tissue varies with animal breed and species specificity (Bauernfeind, 1973).

As a direct colorant, β-carotene may be utilized in fat-based products, using oil solutions and oil suspensions, or in water-based products, in

TABLE 2. *Food applications of carotenoid food colorings (Emodi, 1978).*

Food product	Form of carotene	Mode of application
Margarine	β-carotene suspensions	To warm oil prior to emulsification
Butter	β-carotene beadlets, suspensions	At salting stage
Primary and natural	β-carotene, β-carotene apocarotenal blend (suspensions, solutions, beadlets)	To milk
Process cheese	β-carotene/apocarotenal blend, apocarotenal (suspensions, solutions)	To warm cheese
Popcorn	22% β-carotene suspension	To warm oil
Frozen desserts	2.45 and 10% β-carotene beadlets, β-carotene blend with vitamin A	To liquid prior to freezing
Simulated dairy products	β-carotene beadlets	To water prior to homogenization
Frozen and dried egg yolk products	β-carotene suspensions, beadlets	To liquid yolk prior to freezing
Juices and beverages	β-carotene beadlets	Prior to canning
Bakery products	β-carotene beadlets	To dough
Frostings	β-carotene beadlets, canthaxanthin beadlets	To product
Salad dressings	β-carotene, canthaxanthin (in separating types, oil preparations; in nonseparating types, oil or water phase type preparations)	To product

liquid emulsions or in colloidal, spray-dried preparations (Emodi, 1978). The solubility of β-carotene in fat- or water-based foods allows for broad applications including margarine, cheese, meat products, juices and bakery products (Table 2).

Some advantages of β-carotene as a food colorant include a "natural" connotation, an abundant and high quality supply, its provitamin A content and its yellow to red pigment. Chemically, β-carotene is stable in the pH range of most food products, it is not affected by reducing substances and it is noncorrosive (Emodi, 1978). However, β-carotene is not an ideal coloring agent. It is more expensive than artificial food colorants, has a limited color range and is sensitive to oxidative degradation (Emodi, 1978).

REFERENCES

1. Bauernfeind, J. C. 1972. Carotenoid Vitamin A. precursors and analogs in foods and feeds. J. Agr. Food Chem. 20:456.
2. Bauernfeind, J. C. 1973. Direct and indirect coloring with carotenoid food colors. I.F.T. World Directory and Guide 26:96.
3. Bauernfeind, J. C. 1978. Carotenoids and food technology. *In* Encyclopedia of Food Science. p. 113-126. AVI Publishing Co., Inc., Westport, CT.
4. Burnett, J. H. 1968. Fundamentals of Mycology. St. Martins Press, New York, NY.
5. DeLuca, H. F. (Ed). 1978. Handbook of Lipid Research: The Fat Soluble Vitamins. p. 1-68. Plenum Press, New York, NY.
6. Emodi, A. 1978. Carotenoids: Properties and applications. Food Technol. 32:38.
7. Isler, O., Lindlar, H., Montavon, M., Reugg, R. and Zeller, P. 1956. Synthesis in the carotenoid series. I. The technical synthesis of β-carotene. Helv. Chim. Acta 39:249.
8. Karrer, P. and Helfenstein, A. 1929. The coloring materials of plants. XVI. Carotene. I. Helv. Chim. Acta 12:1142.
9. Lowry, L. K. and Chichester, C. O. 1971. The role of thiamine, leucine, and CO^2 in the biosynthesis of carotenes by the mold *Phycomyces blakesleeanus*. Phytochemistry 10:323.
10. Lui, N. S. T. and Roels, O. A. 1981. Vitamin A and carotene. *In* Modern Nutrition in Health and Disease. Goodhart, R. S. and Shils, M. E. (Eds.). p. 152. Lea and Febiger, Philadelphia, PA.
11. Rose, A. H. 1976. Chemical Microbiology. p. 314. Plenum Press, New York, NY.
12. Wackenroder, H. 1831. Ueber das oleum radicis dauci aetherum, das carotin, den caroten zucker and den officinellen suceus dauci, etc. Diss. de Anthelminticis, Gottigen. Geiger's Magaz. Pharm. 33:144.
13. Willstater, R. and Meig, W. 1907. Ueber die gelben Belgeiter des chlorophylls Ann. 355:1.

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Bacterial Quality of Store Purchased Milk Samples

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The Pennsylvania Milk Flavor - Quality Program has included the purchase of over 14,000 samples from stores since 1967. More than 50% of the stores now hold milk at 40°F or less, while less than 10% have milk at over 45°F. Most dairy plants are doing an excellent job as about three fourths of the coliform counts are less than 1 per ml. and over 80% of Standard Plate Counts are less than 5,000 per ml. About 90% of store purchased milk samples meet the standards for fresh milk. Consumers can be assured that nearly all milk in stores in Pennsylvania is of acceptable to excellent quality.

INTRODUCTION

An educational program directed to farmers has been underway since 1964 to help improve milk flavor. Results of testing store purchased samples has been the key to the interest and cooperation of the entire dairy industry. Early studies showed that the source of most quality problems was not at farms. Therefore, program emphasis shifted to working with processing plants, supermarket chains and food service operations. Milk temperature and bacterial counts of store purchased samples have been made and results sent to processors along with compliments or suggestions. This program has no connection with regulatory agencies, except that an annual summary of results is shared with them. Interest and cooperation of farmers, cooperatives, juggers and dealers has been excellent. Funding is provided from all segments of the dairy industry to cover purchase of samples and travel to stores throughout Pennsylvania.

**Presented at the 70th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, August 7-11, 1983, Marriott Pavilion, St. Louis, Missouri.*

PROCEDURE

During 1982, the PA Milk Flavor - Quality Program involved the purchase of 1,720 milk samples from 599 stores throughout the state. These samples represented 103 milk dealers and 110 juggers which process and sell milk in the state. An attempt is made to get HVD, lowfat and skim samples of each brand up to four times a year. However, it all depends on where our travel schedule takes us to conduct extension educational meetings. More than 14,000 samples have been purchased since 1967, with about 1,500 annually in recent years.

Samples are purchased on an unannounced basis from all kinds of outlets which sell milk. Samples are transported on iced, insulated cases. Temperature and open date are recorded immediately after purchase. Coliform and Standard Plate Counts are made in the University Creamery laboratory within 48 hours of purchase of samples, using Standard Methods for the Examination of Dairy Products procedures.

RESULTS AND DISCUSSION

In earlier years up to one-third of the samples were at temperatures above 45°F during summer months. As a result of the educational effort and the adoption of a maximum temperature for milk in stores by the Pennsylvania Department of Agriculture, there has been much improvement. More than 50% of stores now store milk at temperatures of 40°F or less. Milk temperatures above 45°F are found in less than 10% of stores. See Table 1 for a summary of milk temperature in 268 stores.

More than one-third of the samples were purchased from farm juggers, who produce, process and sell milk at their farms. Most of them bottle milk in one-half gallon glass bottles. At stores with milk in paper or plastic, temperature was determined by holding the thermometer between two containers. In Pennsylvania all containers of milk except from juggers are required to show a 10 day open date. The average age of open dated samples is about six days at the time of purchase and over seven days when tested.

Bacterial counts were made direct and at 1 to 10 dilutions, respectively, for coliforms and the Standard Plate Count. Results shown in Tables 1 and 2 indicate that about 90% of store purchased samples meet the standards for fresh milk. Regulatory standards of less than 10 coliforms per ml. and a Standard Plate Count of no more than 20,000 per ml. apply only as long as products are under control of the processing plant.

Note that about three-quarters of the coliform counts are less than one per ml. while over four-fifths of the Standard Plate Counts are less than 5,000 per ml. Processors should aim for bacteria counts of less than these levels, whether samples were purchased at stores or held at 45°F for 10 days.

It is apparent that most plants do an excellent job. Consumers can be assured that they purchase high quality milk.

TABLE 1. *1982 milk temperature - 268 stores.*

	No.	%
40°F or less	142	53.0
41°F to 45°F	101	37.7
Over 45°F	25	9.3

TABLE 2. *1982 coliform counts - 1,720 samples.*

Per ml.	No.	%
Less than 1	1,261	73.3
1 to 10	220	12.8
More than 10	239	13.9

TABLE 3. *1982 standard plate counts - 1,720 samples.*

Per ml.	No.	%
Less than 1,000	937	54.5
1,000 to 4,900	460	26.7
5,000 to 9,900	88	5.1
10,000 to 19,000	65	3.8
20,000 or more	170	9.9

A form letter provided results and our recommendations to each processor. When a quality problem was noted, a variety of short mimeographs were included. These explained the probable causes and outlined suggested corrective measures. Bacterial Quality of Pasteurized Milk, and Correcting Coliform Problems of Pasteurized Milk were directed to processors. In addition, two single sheet mimeographs covered recommended handling practices for milk and were directed to food service and store personnel.

Two other means have been used to help processors provide good quality milk. Slide sets with cassette tapes may be purchased or borrowed through county Extension offices. Those related to quality and handling included the following:

Cleaning and Sanitizing Food Processing Equipment
Handling Dairy Products in Schools and Restaurants
Food Plant Housekeeping
Tests for Milk Quality and Composition
Dairy Products - Processing to Purchase

Producing Milk of Good Quality and Flavor - These slides sets have been used to train personnel. In addition, seven regional meetings are conducted each year in Pennsylvania. At these evening session discussions of quality, processing procedures and regulations have been held. These have seemed to be of great help to processing personnel. All of the nearly 300 people who have attended each year, want these meetings conducted annually.

SUMMARY

Consumers can be assured that nearly all milk in stores in Pennsylvania is of acceptable to excellent quality. Processors are interested, take action to correct any quality problems, and have provided financial support for an educational program. More states are urged to establish quality educational programs with industry support. These efforts complement regulatory efforts and are of benefit to processors, producers and consumers.

Dairy and Food Sanitation, Vol. 4, No. 3, Page 95 (March 1984)

Packaged Fluid Milk Quality Is Not Homogeneous

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and
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A common assumption among quality control personnel in the dairy industry is that the rate of spoilage of pasteurized packaged fluid milk is uniform for a given production run. Recently, we observed in our laboratory that the keeping quality of fluid milk samples from a single production run, even samples of 10 cartons taken sequentially from a filler, can have quite a wide variation in shelf life (*1*). For example, representative sample sets from three different plants (Table 1) showed variation in both intensity and character of sensory properties.

Furthermore, it was observed that keeping quality was not necessarily related to the stage of run (Table 2).

The obvious is that the shelf lives of different cartons of milk from a single production run is not homogeneous. This rather simple observation should have a fundamental impact on how we sample fluid milk to determine its shelf life. For one thing, this observation tells us that determining the keeping quality of one or two cartons of product from a single production run will not provide accurate information about the keeping quality of an entire lot of milk. Instead, standard statistical sampling procedures need to be used in order to gain this information. Modern-day management and sanitation procedures require that such an approach be taken in order to obtain accurate keeping quality data.

In taking this approach we relied on taste testing rather than bacteria counts to determine the keeping quality. For those of us who have been trained as microbiologists, the idea of not relying on bacteria counts to determine keeping quality may seem heretic. However, it needs to be remembered that we determine bacteria counts for two fundamental reasons: 1) regulatory or food safety reasons and 2) to determine keeping quality. As it is well known that bacteria counts in pasteurized milk are relatively poor indicators of keeping quality, it would seem wise to take a low-cost approach drawing multiple samples and using sensory evaluation as the routine procedure for determining keeping quality.

REFERENCES

1. Maxcy, R. B., and S. E. Wallen. 1983. Heterogeneity of samples as a problem in shelf life prediction. J. Food Prot. 46:542-544.

TABLE 1. *Examples of variation in sensory properties of sequential milk samples taken from three plants after 21 days storage at 5°C.*

	Relative acceptability			
Plant	a *	b	c	d
B	8	1		1
C	4	2	2	2
D	3	2	1	4

* Code: a - normal, good milk
b - Slight off-flavor, but commercially acceptable.
c - Commercially unacceptable.
d - Grossly defective.

TABLE 2. *Effect of stage of production on sensory quality of sequential samples of milk (10 half pints) taken at the early, middle and late stages of a single production run after 19 days of storage at 5 to 7°C.*

Phase of Production		
Early	Middle	Late
8 acceptable	10 unacceptable	4 acceptable
1 slight off-flavor		1 slight off-flavor
1 unacceptable		5 unacceptable

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Letters to the Editor

RE: Association Name Change

DEAR EDITOR:

I was most disappointed to read in the 70th Annual Meeting Report (November 1983 issue, p. 1009 of the *J. Food Prot.)* that the Executive Board had passed a motion to table the proposal for changing the name of the Association to the International Association for Food Protection. The major reason given (at least it headed the list) was that the National Milk Producers' Federation Committee (NMPFC) resolved not to approve a name change which would eliminate the word, milk. Now I am totally unable to conjure up the rationale used by the Executive Board of this Association for allowing a resolution of the NMPFC to have greater influence on the decision to change the name of our Association than the majority of the IAMFES membership (2/3 of them) who voted in favor of the name change. It is strange democracy that allows the wishes of the majority of our members to be overridden by a Committee which is only peripherally involved with the Association. The NMPFC's resolution should have had little or no bearing on this Association's decision to make the name change.

The second reason given for stalling on the decision, was that there "could be" problems registering the name. The fact that there could be problems is no reason to stop pursuing a desirable objective. Let's get the details of any complications involved in registering the new name and stop repeating this "could-be-problems" argument for not moving on this issue.

Then finally the Board infers as a third reason for not taking action on changing the name - "many of our members are connected with milk". To that I can only say that it is hoped that those milk sanitarians, whose eyes still well-up at the mere mention of removing the word milk from the name, will one day mature to the stage where they will accept milk as a food (after all they have been calling it "nature's most nearly perfect food" for a long time) and accept the concept that milk, food and environmental sanitarians are all dedicated to the task of food protection.

By tabling the proposal for the change in name, the Executive Board has left this issue to be resolved by some future Board. A lot of the time and money invested heretofore in the project will be lost and there will be further delays in positively responding to the wishes of the majority of the membership.

The Executive Board had the justification, the opportunity and the mandate for proceeding with the name change. Somewhere along the way they lost their nerve. We can only hope that the new Executive Board will have the courage to take prompt action in getting the proposal off the table and continue toward the establishment of a new name for the Association.

A. N. Mhyr
Department of Food Science
University of Guelph
Guelph, Ontario
N1G 2W1

Editor's Note: Dr. Myhr served as president of the IAMFES in 1967-68.

DEAR EDITOR:

I am writing in regard to the proposed name change of our association. Since I voted for the name change to "International Association for Food Protection", along with the majority of members, I am curious as to why no action was taken on the proposal. According to the November, 1983 *Dairy and Food Sanitation* publication, this is what happened:

> "Name Change Proposal: Of over 800 responses to the vote by the membership on changing the name of the association, 2/3 of them were in favor of changing the name to the "International Association for Food Protection". Arledge said the National Milk Producers Federation Committee made a resolution that they would not approve a name change eliminating the word milk. After discussion by the board it was felt that there could be problems registering the name and that many of our members are connected with milk. It was motioned and seconded that the proposal be tabled."

This one paragraph explanation raises a number of questions regarding the lack of action by the I.A.M.F.E.S. Executive Board:

1. Does the Executive Board represent the members?
2. If yes, then why did they not follow the directions of their members?
3. Why did they bother to ask their members what they wanted if the Board did not intend to act on it?
4. How can a committee force the Executive Board to take action against the desires of the membership?
5. Did the "National Milk Producers Federation Committee" threaten to pull out of the Association if they did not get their way?

I feel the main issue here is not what the name of our association is, but rather does the Executive Board respond to the wishes of the members? Certainly their lack of action on this issue could only lead to a negative response.

Tom Chojnacki, R.S.
Chief Sanitarian
DuPage County Health Department
Wheaton, IL 60187

DEAR EDITOR:

In 1982, a ballot was sent to all members of IAMFES polling the membership of its interest in changing the organization's name. The results of this ballot were published in the President's Perspective section of the December 1982 issues of *Dairy and Food Sanitation* and *Journal of Food Protection.* Of the 876 respondents, 782 (89.3%) voted to change the name to either *International Association for Food Protection* or *International Association for Milk and Food Protection,* while a mere 92 (10.5%) respondents voted for no name change.

Now let's look at how the IAMFES Executive Board has utilized these overwhelming results of the ballot. In August 1983, the Executive Board discussed the proposed name change. The action they took was published in the November 1983 issues of *Journal of Food Protection* (p. 1009) and *Dairy and Food Sanitation* (p. 433). In summary, it was brought to the attention of the Board that "the National Milk Producers Federation Committee made a resolution that they would not approve a name change eliminating the word 'milk'." After discussion by the Board, it was felt that there could be problems registering the name and that many of our members are connected with milk. It was motioned and seconded that the proposal be tabled. Then the Executive Board of IAMFES met again in November 1983 and no futher action was taken concerning the name change.

I, for one, am confused regarding this matter. As a concerned member of IAMFES, there are several questions I feel I must ask at this time: Why has the IAMFES Executive Board not acted according to the wishes of the vast majority of our membership? Should the views of the National Milk Producers Federation influence how IAMFES handles its affairs? Is it wise for IAMFES to ignore the wishes of approximately 90% of its members? What will happen to our association if this silent majority becomes dissatisfied in significant numbers? When can we expect the Executive Board to take action on the membership's call for a name change?

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Response from the President of IAMFES

DEAR EDITOR:

The Executive Board of IAMFES has devoted considerable time during the past two years in discussing the advantages and disadvantages of a "new" name change of our organization. The Journal Management Committee had requested the Executive Board to change the name of IAMFES.

A questionaire was sent to the membership soliciting their interest. Some members have indicated that the wording on the questionaire was heavily slanted to make the general membership feel that the Executive Board had already made a decision to change the name. Truthfully, the Executive Board was really interested in receiving input from the members, to help guide us in making the proper decision. It is possible that many members felt that they had to vote for a name change; on the other hand, many did not vote.

As President of IAMFES, I am acutely aware that 872 members chose to vote on the questionaire. Unfortunately, 1106 members did not choose to vote. Because of my conservative nature, I find it difficult to say that a positive vote for a name change by 40% of the IAMFES membership constitutes a majority of that membership. Certainly, a simple majority of 995 members voting for a name change would have provided needed input to the Executive Board.

Perhaps the arguments for or against a name change were not clear to the membership. What do we achieve by a name change? Additional membership? From where? The name is too long and doesn't reflect the membership composition? In the case of the latter, there is insufficient information available on the composition of IAMFES membership and this probably was a key reason for the Executive Board not being able to hammer out a decisive action. There were other reasons which affected the discussions that resulted in the tabled motion.

Over the years, the name of our organization has been modified to reflect the needs of other outside groups with similar interests in sanitation. The "International" has been an association of sanitarians for 46 years. The most recent modification of the Association name change was to include Environmental Sanitarians. Since the projected name changes did not include the term "environmental", perhaps these members believed that they were being left out on purpose, and are considering changing organizations when one of the projected "new" names became effective.

I was also concerned that the IAMFES Council of Affiliates did not make a recommendation to the Executive Board as to its views on a potential name change. We always look to the Council of Affiliates for its input, which has resulted in major improvements to the Association.

It is particularly essential that the membership consider the economics of operating the affairs of "International", when considering a significant name change. Income, in the form of dues, received from 1,978 direct and affiliate members, was $87,585. in 1983. Approximately 1600 subscribers paid $87,735. In addition, major income from advertisers amounted to $32,627 and 37 sustaining members contributed $10,650. As a non-profit organization we cannot afford to operate in the "red" without dire consequences. From 1979 to 1982, our expenses exceeded our income, despite a rise in dues in September 1981. In 1983 (Annual Meeting Financial Report), the "International" was in the "black" for the first time in five years. Other professional organizations are still having financial problems. For the future, the Executive Board is anticipating continued positive financial growth. One of the reasons for our optimism is the results of telemarketing techniques being utilized by the Executive Secretary, to secure new advertisers, subscriptions and members and, at the same time keep the old ones satisfied.

I believe that it naturally follows, in the operation of an organization during these inflationary times, that has seen our income jump from $170,842 in 1979 to $309,993 in 1983, that "International" has to be considerate of the views of our subscribers, advertisers and sustaining members as regards a potential name change. Lest we become careless, we should also remember that our expenses during the same time frame have increased from $172,098 to $264,795. Prior to the last Annual Meeting, we had not sought input from the above groups who provide necessary income to meet our expenses; some members feel that these groups should not be consulted when a change in organization name is being considered.

As President, I feel it is necessary that the IAMFES receive information from a combination of feedback mechanisms, which include economic considerations, membership vote, and the Affiliate Council, which will result in action by the Executive Board on the need of a name change. We are now in the process of accumulating information concerning the present occupational composition of the membership. Sustaining members, subscribers and advertisers will be contacted to express their views on the need for a name change. Assuming that the Executive Board acts in favor of a name change, I am taking steps to investigate the legal ramifications of registering a name change.

In conclusion, these are the things that the Executive Board plans to do: (1) determine the occupational composition of the membership; (2) contact the subscribers, sustaining members, and advertisers to determine their views on the need for a name change; (3) request input from the Affiliate Council on the need for a name change and its recommendations; and (4) investigate the legal ramifications involved in registering a name change.

A. Richard Brazis
President, IAMFES
Chairman of the
Executive Board
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Editor's Note: Other members with views on the subject discussed in the foregone letters, are invited to share their views with our readers via the Letter to the Editor. Letters may be sent to the Editor of the Journal of Food Protection *or the Editor of* Dairy and Food Sanitation.

Aseptic Processing and Packaging Workshop at Purdue University

An Aseptic Processing and Packaging Workshop is scheduled for April 30-May 3, 1984 at Purdue University in West Lafayette, IN.

The Aseptic Processing and Packaging Workshop is being structured to update the participants in the state-of-the-art aspects of this field. Excellent resource people have been invited to present pertinent information relative to aseptic processing and packaging.

Topics will cover the microbiology, chemistry, unit operation, packaging and quality assurance aspects of this technology. Selected relevant handout materials will be provided the workshop participants. In addition, activity is planned to provide the workshop attendee "hands on" experience with aseptic processing principles and equipment available in the Food Science Department's well equipped pilot and research laboratory facilities.

Fee for the workshop is $1,000. Attendance will be restricted to 40 participants and will be handled on a first come-first serve basis. Enrollment deadline is April 16, 1984.

For more information contact: Dr. James V. Chambers, Workshop Coordinator, Dept. of Food Science, Smith Hall 101D, Purdue University, West Lafayette, IN 47907. 317-494-8279.

John Meyer Named Whirl-Pak Sales Supervisor

John Meyer has been promoted to Whirl-Pak Sales Supervisor at Nasco, the Fort Atkinson, Wisconsin based manufacturer of Whirl-Pak sterilized sampling bags.

Meyer has been a Sales Representative of the company since June of 1981, marketing the sampling containers to dairies, milk marketing cooperatives, dairy herd improvement associations, state health departments, water departments, and the food processing industry. He represents Nasco as a member in the Dairy and Food Industry Supply Association and serves on the organization's public relations committee.

As Sales Supervisor, Meyer will be in charge of Nasco's nation-wide Whirl-Pak sales effort and is responsible for production of its sampling container catalog.

Whirl-Pak bags are single-use, sterilized plastic bags that are used widely throughout the dairy and food industry for sampling purposes. They feature an unique design that allows opening and closing the container without contamination of the sample.

Meyer is a graduate of the University of Wisconsin-Eau Claire where he studied Speech and Marketing prior to his employment at Nasco.

Canola Can Replace Soybean Meal in Dairy Herd Rations

Dairy producers can take a substantial bite out of the cost of dairy cow rations by feeding canola meal in place of soybean meal.

Canola meal can substitute for all or part of the soybean meal fed to dairy and beef cattle, say Herbert Bucholtz and William Thomas, dairy nutritionists at Michigan State University.

They report that during 11 recently conducted dairy cow feeding trials, milk production, fat test and ration intake were identical in groups of cattle fed canola meal and comparable groups fed soybean meal.

"Currently, canola meal in Michigan costs about $175 a ton," Bucholtz says. "Soybean meal is more than $260 a ton."

The canola seed, from which oil and meal are derived, is similar in some ways to the rapeseed. Unlike rapeseed oil and meal, which are high in erucic acid and glucosinolate and therefore cannot be fed to livestock, canola meal and oil contain less than 5 percent erucic acid and less than 3 milligrams per gram of glucosinolate. It took Canadian plant breeders about 10 years to develop canola.

Canola meal has slightly less protein (39 percent), energy and total digestible nutrients (TDN) but more fiber, oil, calcium and phosphorus than soybean meal (44 percent proten). Milk from cows fed canola meal will contain less iodine, Bucholtz says.

"Though canola meal can be readily fed to dairy and beef cattle, producers should carefully calculate herd least-cost formulations before making a switch from soybean meal," Thomas says.

Farmers can check with their local county Cooperative Extension Service agricultural agent for details on purchasing and using canola.

East Tennessee State University Offers Two Short Courses

East Tennessee State University's twenty-eighth annual Environmental Health Institute will run May 14, 1984 to August 9, 1984 and will offer both Graduate and Undergraduate credit for the Intersession and two Summer Sessions. Subjects covered in the Intersession which starts May 14 and ends June 1, 1984 are: Environmental Virology; Advanced Chemical Analysis of Water and Wastewater; and Hazardous Waste Management.

Subjects covered during the Summer Sessions are:

Session I- June 3 to July 6, 1984: Introduction to Environmental Health; and Water Treatment.

Session II- July 9 to August 9, 1984: Human

Ecology; Environmental Sanitation; Principles of Radiological Health; and Water Pollution Control.

Entire Term- June 3 to August 9, 1984: Ergonomics; Food Sanitation Principles; Environmental Planning and Research and Thesis.

For more information contact Dr. Vay A. Rodman, Department of Environmental Health, Box 22960A, East Tennessee State University, Johnson City, Tennessee 37614-0002.

Study Shows Connection Between Mastitis and Poor Milk Procedures

Poor milking procedures are a major cause of mastitis in lactating cows. That is the conclusion of a University of Minnesota Agricultural Extension Service field study with cooperating dairy farms.

A study of a mastitis Control Project involving 40 Minnesota dairy herds with serious mastitis problems showed that 80 percent of them had milking procedures problems that were contributing to mastitis.

"Although correcting improper milking procedures requires very little, if any added expense to the farmer, they are often the most difficult changes to implement," says Jeffrey K. Reneau, dairy specialist with the Minnesota Agricultural Extension Service. "Correcting bad milking habits requires a persistent, conscious effort."

But those efforts will be rewarded with fewer incidences of mastitis, the study shows. All dairy farmers participating in the Mastitis Control Project had reductions in herd average somatic cell count and in the percentage of cows with cell counts over 500,000. "One cooperator experienced a 700,000 decrease in average herd cell count while watching milk production rise an average of 3,000 per cow," he says.

Some recommended milking procedures involve a simple change. For example, using a common sponge or wash rag to prepare udders for milking is routine among Minnesota dairy farmers, yet this practice will enhance cow-to-cow spread of mastitis pathogens, Reneau says. Thirty percent of milkers on the farms cooperating in the Mastitis Control Project used a common sponge or rag. After 18 months on the programs all milkers started using a single service paper towel.

Recent California research emphasizes the need to dry udders before machine application. "To prevent mastitis, drying is just as important and maybe even more imporant then washing during udder preparation," Reneau says. At the beginning of the project, 82 percent of the milkers did not dry udders. After 18 months half of the milkers were routinely drying udders.

Another proper milking procedure Reneau stresses is the amount of time spent prepping cows. A recent Minnesota DHIA survey showed that 82 percent of milkers in DHIA herds felt they spent enough time prepping cows to achieve maximum milk letdown, yet 54 percent didn't realize a minimum of a 20 second massage is needed to achieve maximum response. At the beginning of the project 58 percent of the milkers provided adequte udder and teat stimulation, Reneau says. But by the end of the project 80 percent of the milkers were providing adequate udder stimulation.

"Many milkers have problems coordinating the milking routine so that milking units are applied 1 to 1½ minutes after udder stimulation while the oxytocin milk letdown is at its peak. This was a problem with the mastitis project herds, particularly when milkers were trying to operate too many milking units. As a result of a poorly coordinated milking routine, 42 percent of the milkers were overmilking," Reneau says. Working with these farmers to correct milking procedure inefficiencies resulted in 36 percent less overmilking.

This change came about by using fewer units, installing more efficient equipment, or by reorganizing the milking routine, he says. "This is an important point since it is at the end of milking, particularly when there is little or no milk flow, that the opportunity for establishment of new infections via teat end impacts is most likely."

"The overmilking itself is not a serious problem if milking equipment is functioning properly. However, proper machine handling and equipment maintenance to limit air slips and thus reduce impacts is extremely important to reduce new infections caused during milking, he says. And yet it is estimated that one-third of Minnesota DHIA dairy farmers do not shut off the vacuum before removing the machine, which will always result in unnecessary air slips.

Reneau points out that milking habits become deeply rooted, and therefore difficult to change. However, good milking habits also become deeply rooted. "All the farmers with poor milking habits improved when those habits were called to their attention, and when a conscious effort was made to change. But they did not improve unless a conscious determined attempt was made. Once the proper procedure became firmly established, there was only slight day to day variation. Clearly, if we are determined to form good milking habits, they will be as hard to break as bad ones and certainly will be far more profitable," Reneau says.

Reducing Chlorophyll Losses of Canned Vegetables

If only our taste buds dictated what we ate, we might not care whether carrots were green and peas orange.

But apperances influence our sense of taste, so even the light color of canned green vegetables deters some consumers.

There may be methods to keep the original, fresh color of canned vegetables by preventing the degradation of chlorophyll during processing, says J. H. Von Elbe, a University of Wisconsin-Madison food scientist.

Scientists have known for some time that canned green vegetables acquire a duller hue when hydrogen replaces the magnesium in chlorophyll to form pheophytins. But Von Elbe and co-worker S. J. Schwartz recently found that the process of chlorophyll degradation isn't quite that simple.

Other chemicals (pryopheophytins) are also formed when chlorophyll breaks down. The relative amounts of both types of compounds depends on temperature and acidity during processing. Both compounds have the same effects on color.

The information should help the canning industry prevent degradation of chlorophyll and perhaps bolster consumption of canned vegetables. For example, canning firms are now studying containers which release small amounts of magnesium to preserve chlorophyll's distinctive color.

The fate of chlorophyll in canned vegetables is no trifling matter in Wisconsin, the source of nearly one-third of the nation's snapbeans and peas, most of which are canned.

Von Elbe notes that frozen vegetables might contain slightly more nutrients than canned vegetables, but they contain essentially equivalent amounts after frozen vegetables are cooked.

Several studies have shown that people prefer the taste of canned vegetables to frozen vegetables when the colors are disguised. But they tend to change their minds when they see the "undisguised" color of canned green vegetables.

The Health of Americans Has Never Been Better

Allegations that the health of Americans has deteriorated as a result of modern technology and lifestyle are not supported by national health statistics. On the contrary, these statistics indicate that Americans are healthier than ever before, according to a report released by the American Council on Science and Health (ACSH), a national scientific organization.

Common measures of the health status of a population, such as life expectancy, infant mortaility, death rate, and infectious disease rates, have all indicated substantial improvements in Americans' health in the 20th century, the ACSH report states.

An American born today can be expected to live an average of 27 years longer than someone born in 1900.

In 1900, approximately 100 of every 1,000 infants born in the U.S. died before their first birthday; today, fewer than 12 of every 1,000 infants fail to survive their first year.

The age-adjusted death rate declined 53 percent from 1900 to 1950, and another 27 percent from 1950 to 1977.

The death rate from infectious diseases has plummeted to record lows in this century. The death rates from heart disease and stroke, the first and third leading causes of death in this country, have declined significantly in the past 30 years. The age-adjusted death rates for most forms of cancer, the second leading cause of death, have been declining gradually since the 1930s.

"Much of the American public believes, incorrectly, that our health has never been worse, and that poor dietary habits and exposure to manmade products, such as food additives, pesticides, and pollutants, are to blame," said Dr. Elizabeth M. Whelan, Executive Director of ACSH.

"The statistics prove this belief wrong," Dr. Whelan continued, "Modern technolgoy and lifestyle have drastically reduced the health hazards to which we are exposed, rather than increasing them."

"While many people think that overall health in this country is bad, they have a more positive view of their individual health," said ACSH Research Associate Cathy Becker Popescu. "When asked to rate their own health status in comparison with that of others in their age group, more than four-fifths of Americans says that their health is excellent or good."

The American Council on Science and Health is an independent, nonprofit consumer education association promoting scientifically balanced evaluations of food, chemicals, the environment, and health. ACSH has offices in New York, New Jersey, and Washington, DC.

A single complimentary copy of the report "America's Health: A Century of Progress but a Time of Despair" can be obtained by sending a stamped (.37 postage), self-addressed, business-size (#10) envelope to ACSH, 47 Maple St., Summit, NJ 07901.

Researchers Find Bar Soaps are "Germ Reservoirs"

Researchers have reported that common everyday bar soaps in normal "in-use" conditions can become reservoirs for dangerous microorganisms of particular concern to the aged, newborn infants, immunosuppressed individuals and others who are considered to be at high risk for infection.

The scientists say that bar soaps, used under normal conditions, may represent a public health hazard and, when adequate quality control measures are instituted during manufacturing, liquid soaps in disposable containers would be a less likely source of infection.

Over a four week testing period, the researchers found more than 100 strains of bacteria, yeast and

fungi on bar soaps used by healthy individuals, including types of organisms which could be associated with skin infections, infections of the respiratory and urinary tracts and botulism. No organisms were found in the liquid soaps tested.

The research was conducted by Jon. J. Kabara, Ph.D. and Mary B. Brady of the Department of Biomechanics at Michigan State University medical school. The findings have been published in a recent issue of the JOURNAL OF ENVIRONMENTAL PATHOLOGY, TOXICOLOGY AND ONCOLOGY.

Dr. Kabara noted that the findings should be viewed with particular concern by those in institutional settings, individuals with compromised immunity and those handling food products.

One hundred percent of the bar soap samples were found to harbor microorganisms, with survival times ranging up to 48 hours after sampling. In contrast, no organisms were found to have invaded liquid soaps, although there was some evidence of contamination on the outside of the disposable plastic containers.

A follow up study in which ten bar soaps from the original survey were placed in a coldroom for four months showed continued contamination.

The Michigan State University study was funded by a research grant from Minnetonka, Inc.

65th NRA, Hotel-Motel Show

1984 marks the 65th anniversary of the NRA Restaurant, Hotel-Motel Show, the world's largest foodservice and lodging exhibition. Over 88,000 attendees and 1,300 exhibitors are expected to turn out for the 65th NRA Restaurant, Hotel-Motel Show, which has received trade fair certification from the Department of Commerce and recognition as the "major U.S. show in the hotel and restaurant equipment industry."

The 65th NRA Restaurant, Hotel-Motel Show, to be held May 19-23, at Chicago's McCormick Place, will show the maturity of its years in the latest foodservice products and state-of-the-art equipment available on the floor and in the seasoned performers and eminent authorities that will participate in special events throughout the 5-day show.

Show hours are 10:30 a.m. - 5:00 p.m. on Saturday, May 19 with Saturday attendance limited to dealers, suppliers and the press; 10:30 a.m. to 6:00 p.m. on Sunday, May 20; 9:30 a.m. - 5:00 p.m. on Monday and Tuesday, May 21-22, and 9:30 a.m. to 3:00 p.m. on Wednesday, May 23.

UC Davis Offers Sensory Evaluation of Food Course

An Introduction to the Sensory Evaluation of Food: Experimental Methods and Statistical Analysis is a five day course focusing on human beings as flavor measurement machines. It will emphasize how sensory systems function and the limitations they impose on sensory methodology.

The course is designed for beginning sensory scientists with little or no statistical background and with elementary sensory experience. In addition, much of the sensory material is new so the course will be an excellent update for the practicing sensory scientist.

Topics to be covered include: sensory and psychophysical testing methods; newer techniques such as signal detection, measurement criterion, context and bias effects, and dognitive algebra; and statistical analysis of sensory data using both traditional and newer nonparametric techniques. The course will emphasize when to use such tests and how much sensory data conflicts with generally held statistical assumptions, resulting in the need for a fresh look at sensory statistics.

This course will take place Monday through Friday, May 7-11, from 9am to 5pm at UC Davis. Michael O'Mahony, PhD, Associate Professor, Dept. of Food Science & Technology, UC Davis will instruct the class. The enrollment fee is $450.

The course is being offered by University Extension, UC Davis. For more information contact: Jim Lapsley, 916-752-6021.

Antibiotic Use Can Impair Development of Immune System

A growing array of antibiotics has been used for more than three decades to treat, and sometimes prevent, disease in animals and humans. But in recent years there has been increasing recognition that continued use of these potent drugs can create problems, according to Dr. Syed A. Naqi, microbiologist at Texas A & M University.

"Antibiotics have been shown to affect various immune functions in animals and humans," Naqi says, "but widespread therapeutic and subtherapeutic use is made of antibiotics in food-animal production, particularly commercial poultry.

"Also, humans having chronic bacterial and fungal infections and those receiving immuno-suppressive regimens also receive antibiotics for prolonged periods.

"While the beneficial effects of antibiotics under such stimulations have been widely acclaimed in the past, their effects on the immune system were largely ignored."

Therefore, scientists with the Texas Agricultural Experiment Station, in the department of veterinary microbiology and parasitology, College of Veterinary Medicine, Texas A & M University, made a study of the effect of antibiotics on the development of the immune system in chickens and turkeys.

"The objective of the first study, Naqi says, "was to define the effects of a specific antibiotic regimen on the development of the immune system in

chickens. This antibiotic regimen included preincubation dipping of fertile eggs in gentamicin solution (500 parts per million), injection of chicks with the same antibiotic (0.2 mg/chick, subcutaneously) and inclusion of chloretracycline in the diet (200 ppm)."

Antibiotic-treated chickens generally carried lower densities of immunoglobulin (Ig) bearing cells, than the respective controls, Naqi says.

However, statistically significant differences were apparant only with respect to Ig cell populations in the cecal tonsils and the large intestine. The treated chickens also had significantly lower serum IgM levels at 28 days of age.

How antibiotics effected suppression of the Ig bearing cells in the tissues and the Ig levels in the serum is unknown. A plausible mechanism is through suppression of the intestinal microflora by the antibiotics and resulting lack of stimulation of the gut associated lymphoid (immune) tissues.

Another question that logically arises is whether or not the immunodeficiency seen in the antibiotic-treated birds is likely to comprise their ability to counter infectious diseases.

Although these studies did not invplve evaluation of immune competence of the treated birds, previous studies have shown antibiotic treatment to result in lower antibody production to various antigens and compromise in phagocytosis (engulfment and destruction of foreign substances) and chemotaxix (migration of injury-reparing cells).

Additional studies with turkey poults essentially confirmed the findings made with chickens, Naqi says.

"In food animals, antibiotics are used to reduce risk of infection and improve growth rate. If antibiotics are reducing infection risk on one hand and compromising host defenses on the other, the risk versus benefit situation should be carefully evaluated. This study is a step towards bringing about this awareness," Naqi concluded.

ADMI and WPI Annual Meetings To Be Held April 18 and 19

The 1984 Joint Annual Meeting of the American Dry Milk Institute and the Whey Products Institute will be held on Wednesday and Thursday, April 18 & 19, at the Chicago Marriott O'Hare Hotel, 8535 West Higgins Road (at O'Hare Airport), Chicago, IL. This will be the 59th Annual Meeting for ADMI ad the 13th Annual meeting for WPI.

All dry milk and whey product manufacturers, allied industry friends interested in the processing, marketing, and utilization of these products, and representatives from government and universities, are cordially invited to attend the meeting.

The General Sessions program will present knowledgeable speakers from industry, government, universities and the Institute's staff, who will discuss topics of current interest to manufacturers and users of dry milk and whey products.

An interesting program is also being planned for spouses attending this Annual Meeting.

For more information contact: Dr. Warren S. Clark, Jr., Executive Director of both organizations, 130 N. Franklin St., Chicago, IL 60606.

Crepaco, Inc. Acquires Anderson Bros.

D. B. Hefner, President of Crepaco, Inc., Chicago, announced the purchase of Anderson Bros. of Rockford, IL. Crepaco, a subsidiary of APV Holdings PLC, Crawley, U.K., is a leading manufacturer of procesing equipment for the Dairy, Beverage, Baking and other food-related industries.

Anderson's equipment line includes ice cream carton and cup filling machines, novelty wrappers, shrink wrappers, and container fillers for yoghurt, cottage cheese, and other products. According to Hefner, the combined lines will increase the overall system capabilities of Crepaco and allow both companies to be more responsive to customer needs.

Anderson Bros. will continue to be headquartered in Rockford with Ray Porter remaining as President, reporting to Hefner.

Changes made in DHIA Somatic Cell Count Reporting

Changes in the somatic cell count reporting for DHIA members enrolled in the program will more clearly show the relationship between somatic cell count and lost milk production, says Robert D. Appleman, dairy specialist with the University of Minnesota's Agricultural Extension Service. Members will start seeing the changes in their reports within the next few weeks.

The changes result because the somatic cell count scores have been converted to a linear score, where each increase of 1 in score is associated with doubling of cell count. The old count was from 0 to 99 (1 = 100,000 cells and 99 = 9,900,000 cells). Now the scores are from 0 to 9.

"As a result the dairy producer will notice a marked increase in yearly average of percent of SCC positive," Appleman says. "That doesn't mean the producer's herd has taken a sudden turn for the worse. What has happened is the cut-off point for determining infected cows has been made much more sensitive."

The decision to change the SCC code was based on the results of research conducted in several states, Appleman says. The old cut-off point (which indicates new infections) was a SCC score of 6, or more than 550,000 cells. The new cut-off is with a

linear SCC score of 5, or more than 300,000 cells. All states have already conformed or will soon be conforming to this new national DHI SCC reporting system.

The statewide average infection rate that existed under the old system has been averaging about 20 percent of the cows, Appleman says. "When the conversion is made to this new linear somatic cell count scheme, we expect the percentage of infected cows to essentially double to a 40 percent reading. What the research shows is that 20 percent of the cows which we were not repoting as infected are, in fact, infected. As a result, milk production potential has been adversely affected.

The new report will help make the consequences of the SCC count clear by containing a statement of estimated daily milk yield loss. "For example, take a small herd of 33 cows. Our reporting shows that converting the SCC count on this herd to daily milk yield loss determined a 124-pound daily loss. That amounts to over $5,000 annually in lost milk production," Appleman says.

The SCC program is an optional program within DHI begun about three years ago. It costs an extra 15 cents per cow per month. Presently, approximately 50 percent of the dairy producers on DHI are enrolled in the SCC program.

The somatic cell count is the best indicator of subclinical mastitis--mastitis that cows may have that the dairy farmer cannot see any signs of. In other words, the milk is not physically altered. Subclinical mastitis costs dairy producers lost milk production and it increases the opportunity for other cows to become infected, Appleman says.

"We don't advocate treating cows with subclinical mastitis during lactation. What is recommended is that certain mastitis prevention practices be instigated. One is to treat cows upon drying off to try to clear up this subclinical infection between lactations. Another is to teat dip with an effective teat dip disinfectant after each milking to prevent the spread of mastitis infection from one cow to another," Appleman says.

"It's important for the dairy farmer to realize that with subclinical mastitis, progress is made by reducing the number of new infections," he says. The DHI summary sheet will report the number of new infections, and "progress is to keep this at zero or very low."

"I-System" Products Introduced by the Dederich Corporation

Improved product consistency and reduced bulk starter cost for Italian cheese production are now possible with new "I-System" products from Dederich Corporation, Germantown, WI.

Mixed at only 7 percent solids, the new "I-System" culture medium for Italian cheese will ripen to the proper pH level in traditional ripening times, and provide a preferred rod-coccus ration of active bacteria, according to Bob Guzman, Project Research Manager.

Cost savings using the new low-solids "I-System" bulk starter are in the range of 10-20 percent when compared to conventional starter systems, added Earl R. Witte, Director Sales & Marketing.

Additional cost savings of another 15-20 percent are available by neutralizing the culture medium after its initial ripening with a special "I-System" neutralizer developed by Dederich. After a second shortened ripening period, a significant increase in bacteria cell population is realized.

The result of using "I-System" starter and neutralizer is virgorous activity in the cheese vat with use levels of about 25 percent less bulk starter than usual.

Dederich Corporation is a manufacturer and supplier of cultures, culture media, coagulants, color and other basic ingredients for the dairy and food processing industries.

For more information contact: Earl R. Witte, Director, Sales & Marketing, Dederich Corporation, W194 N11411 McCormick Drive, PO Box 218, Germantown, WI 53002. 414-251-6171.

Dairy Farmers Should Investigate New Milk Pricing Systems

New milk pricing systems are raising a lot of questions.

For some dairy farmers, they might provide enough additional income to offset the milk tax. Other dairy farmers might find it more profitable to stick with traditional (butterfat only) pricing systems.

Act on information, not impulse, says Dave Dickson, dairy scientist with the University of Wisconsin Cooperative Extension Service.

It's not time for hasty decisions, but it's not too early to plan ahead, Dickson adds. And don't panic. There's plenty of time to determine how a pricing system will affect your milk check.

Many new pricing systems pay premiums for milk containing more than 3.2 percent protein. Some milk plants may test for protein even though they don't offer protein premiums. If you're not sure what percent protein your herd is testing, it's probably a good idea to find out now.

You can cull to increase protein levels if you know how individual cows test. Remember that butterfat tests don't always reflect protein tests. Cull according to each cow's actual protein test as determined by DHIA or other individual cow records.

Adding high-testing colored breeds can also raise a herd's average protein levels. That's been a popular option in many California herds where minimum protein standards are in effect.

Sire selection is a slower route to improvement but one that's likely to receive more emphasis as more sires acquire protein proofs.

Dickson says percent protein is less variable than butterfat. Heritability is about the same as butterfat test. Although butterfat and protein levels tend to be related, selecting for PD percent fat or PD$ won't automatically mean you've selected for protein as well.

"There's no question that the increase in percent protein is genetically associated with lower milk production," says Dickson. That's one reason why dairymen have to think through their options carefully.

Dickson suggests sticking to the top sires and not basing selection solely on protein proofs. Eliminate the worst protein bulls and limit use of bulls with poor protein proofs. However, don't eliminate top sires just because they lack protein proofs.

Changes in feeding practices have little or only temporary effects on protein production. Balanced rations which increase total production also tend to maximize protein production.

High-energy, low-roughage rations which depress fat levels also tend to depress protein levels. Increasing protein levels in rations may temporarily increase protein levels, but probably not enough to offset the additional cost of protein supplements.

Protein levels may decrease at temperatures of about 55 degrees and are highest during the winter months.

Milk from younger cows tends to contain a slightly higher percent protein than milk from cows more than six years of age. Remember that older cows produce more milk even though protein levels drop slightly.

Dickson thinks the new pricing systems based on protein, lactose or other major milk solids will become more popular.

So will premiums for high-quality milk with low bacterial or somatic cell counts.

The new pricing systems probably benefit the entire industry. Higher solids content and better quality milk improve yields of solid dairy products and cater to consumer preferences.

"The issue isn't going to go away," Dickson says.

Dickson recommends dairy farmers join DHI testing programs to monitor protein production and milk quality. Also, pay more attention to protein proofs of AI sires. Remember that no pricing system will make up for poor herd management or unbalanced rations.

Beef Provides Nutrients for Dieters

Many dieters deny themselves beef when they might be better off including it in their meals, says nutritionist Marilyn Haggard.

Beef and other meats are nutrient-dense foods that provide relatively large amounts of essential nutrients in relation to the total calories they contain, she explains.

"When dieting it can be difficult to obtain recommended levels of all nutrients, especially those which are present in relatively low concentration in foods," says the Texas A & M Agricultural Extension specialist.

Nutrition-conscious dieters who are concerned about getting enough vitamin B-6, iron and zinc, will often take costly vitamin pills and dietary supplements. Yet beef is an easily available source of these nutrients, says Haggard.

The key to including beef in low-calorie diets is selecting lean meat and eating it in approximate amounts, says the nutritionist.

For example, a 3-oz. serving of cooked lean meat will provide a considerable quantity of B-vitamins, minerals like iron and zinc, but contains only 200 calories.

Increasing consumption of lean meat is one way to improve the zinc and iron content of a diet low in calories, Haggard says.

Teenage girls and women who are dieting should be especially concerned about their consumption of lean meat, since this is the group most likely to be iron-deficient, notes the specialist.

Footrot Can Be Costly for Dairy and Beef Producers

Footrot can be costly for dairy and beef producers. It can so severely affect cattle that the only alternative may be to send them to slaughter. More likely, however, are losses due to reduced milk production, decreased rate of gain or diminished breeding efficiency.

Footrot is most common in adult cattle during wet periods in spring and fall. It results when bacteria enter lesions on the foot. Wet manure and mud can soften the skin between the claws and dried or frozen mud, stones and stubble can bruise and cut the tissues, permitting infection. Or, it may occur when wire or bailing twine becomes wrapped around the hoof. A typical sign is a break in the skin between the claws. This lesion may contain puss and stink. As the infection progresses, the foot swells and the animal limps.

Animals may recover without treatment, but they will be lame for several weeks. Far better is early treatment of the lesion and injections of antibiotics or sulfonamides, says Dale Haggard, a veterinarian with the University of Minnesota's Agricultural Extension Service. For more severe cases, the foot should be scrubbed and all necrotic tissue trimmed away. The hoof should be trimmed if necessary, an antibacterial dressing applied and the foot bandaged.

Penicillin, tetracycline, or sulfas may be injected to fight the infection. Daily treatment begun right after

the onset of lameness usually will result in recovery in two to four days. Animals should be kept on a dry surface until they are well, Haggard says.

The chances of footrot can be reduced by removing cattle from stubble fields and other areas where injury is likely to occur. Drain or fill in muddy or stony areas in lots and lanes.

Wet or dry footbaths can also help remove irritants, harden the hoof and decrease susceptibility to infection. The animals should pass through the baths once or twice a week. Effective wet baths are a 2- to 5-percent solution of formalin or a 5-percent copper sulfate solution (10 pounds copper sulfate to 25 gallons of water). One part copper sulfate to nine parts slaked lime is a popular dry bath.

Feeding chlortetracycline to feedlot cattle at a rate of 500 milligrams/head/day for the first 28 days, followed by 75 milligrams/day thereafter, also reduced the incidence of footrot considerably. However, the withholding period should be carefully observed before the cattle are slaughtered.

Recent research indicates that feeding organic iodides such as ethylenediamine dihydroiodide (EDDI) for an extended time to prevent and treat footrot may cause other health problems, so this should be avoided.

Dietary zinc supplementation does not pose such hazards. Zinc sulfate (1.8 to 3.2 milligrams/pound/day) and zinc-methionine (4.5 grams/head/day) can be used to treat and prevent footrot. The latter, an organic compound, is more easily absorbed from the digestive tract than other forms of zinc.

USDA Places Utah Meat Distributor Under Special Restriction Program

A bulk meat distributor who was found guilty of defrauding consumers in Colorado, Utah, Wyoming, Oregon and Idaho under the trade name of Meat Masters, has been ordered to pay $20,000 and placed under a special U.S. Department of Agriculture restriction program.

B. H. Jones, head of USDA's Packers and Stockyards Administration, said Larry W. Peterman, Layton, UT was also ordered to cease and desist from bait and switch advertising practices and misrepresenting the meat products he sells.

Jones said the special restriction order requires Peterman to notify USDA at least 10 days prior to opening any meat distribution business, post a copy of the order in each store, advise each prospective customer that the business is operating subject to the order, and allow each customer a 48-hour "cooling off" period.

Jones said the special restriction provision and the cease and desist order are important tools in helping USDA protect consumers.

Although several state and local government agencies had taken action earlier against Peterman, their limited jurisdictions would not prevent him from moving to a new location and starting a bait and switch operation all over again.

"The USDA order is similar to a permanent injunction," Jones said. "It will cover any future meat sales activities by Peterman or his employees anywhere in the United States and its terriories."

The P & S Act is an antitrust, fair trade practice and payment protection law. It is designed to maintain integrity in the marketing of livestock, poultry and meat, and in the marketplace.

More Efficient Milk Homogenization Could Save Energy

Milk homogenization which blends the fat into whole milk and prevents it separating out as cream is extremely inefficient with respect to energy use, according to scientists at Texas A & M University.

In high-pressure homogenization, particularly, the fluid product is forced through a narrow slit at very high pressures in order to reduce ths size of the fat globules and cause them to disperse in the milk serum, according to Dr. Vincent E. Sweat, professor in food engineering, and a member of the team of researchers who made the study for the Texas Agricultural Experiment Station.

The homogenizer valve invented by Gaulin in 1898 is still in use today. It was adopted because it gave good results in homogenization of milk.

"However," Sweat says, "since milk fat constitutes only five percent of the total volume of milk and less than five percent of the total weight, we can infer that a process like high-pressure homogenization of milk intended to induce a change in the fat globules only, but which subjects the total milk volume to the same high-pressure, is inefficient.

"We realize that present methods are costly, energywise, and made this study in order to further define the energy efficiency of the homogenization process and consider alternatives and where research may be needed.

"Our review team, which included Dr. Ronald Richter, associate professor in animal science, Larry Gardner, graduate research assistant in agricultural engineering; and Ricardo Casinelli, of Lima, Peru, developed several interesting possibilities.

"1) there is an indication that milk is over homogenized, at least from the prevention of creaming. An analysis of fat globule rise due to buoyant forces predicts much greater separation than that which actually occurs.

"This would indicate that there is considerable 'anchoring' of interfacial forces between fat globules

and milk serum so that it may not be necessary to obtain such small fat globules, as used in the present process. There is a need to better define the potential 'anchoring' forces as a function of fat-globule diameter.

"2) Also, as mentioned earlier, since fat is only five percent of milk volume it seems obvious, from the standpoint of energy efficiency, that it would be better to separate the fat before homogenization, and then homogenize the fat and just enough milk serum to surround the fat globules and keep them separate.

"Once this was done, this low volume product could be blended with the remainder of the milk at much lower expenditure of energy," Sweat concluded.

Dairy Profits in the Southwest are Higher Than in the Midwest

A milk producer starting from scratch may find it more profitable to locate a dairy in the Southwest, rather than in the traditional dairy states of Minnesota and Wisconsin, according to a recent study in the latest issue of The Minnesota Agricultural Economist.

The study, "Profitability of Minnesota Dairy Farms Compared to Large Drylot Dairies in the Southwest," was made by Boyd Buxton, a researcher with the U.S. Department of Agriculture at the University of Minnesota, and others.

Costs and profits for dairy operations in Minnesota, Wisconsin, Arizona and New Mexico were compared in the study. The results show that the expected annual rate of return for a large (900-cow) dairy in New Mexico, for example, will be 20 percent compared to only 6 percent for a 125- cow Minnesota dairy farm.

Buxton says the southwest dairies need less money for buildings and equipment and have lower average costs because the operations are larger. Per-cow milk production is higher in southwest dairies as well (over 16,000 pounds annually compared to 14,800 for Minnesota.) This may be due in part, Buxton says, to their employing more specialized workers. In Minnesota, the farm operator typically is responsible for all dairy chores plus planting and harvesting crops for feed.

Despite the implications of the study, Buxton says, "Minnesota and Wisconsin will remain significant suppliers of dairy products, but their share of the U.S. market might be smaller in the future."

Copies of the publication are available from the Department of Agricultural and Applied Economics, 231 COB, University of Minnesota, St Paul, MN 55108.

Milk Fewer, But Better Cows

Dairy farmers shouldn't try to participate in the milk diversion progam by "temporarily" making cows produce less milk.

Tactics such as underfeeding or grossly lengthening the calving interval can seriously harm cows, says Jim Crowley, dairy scientist with the University of Wisconsin Cooperative Extension Service.

Attempting to decrease milk production in these ways will result in grossly overconditioned dry cows, mastitis and other ailments. Long-term costs will probably be far higher than short-term gains.

"Trying to be 'inefficient' for 15 months to collect incentive payments and then becoming 'efficient' 15 months later is a risky proposition," Crowley adds.

Crowley says the new dairy legislation will help many dairy farmers improve herds while maintaining income.

About 25-30 percent of the cows in a herd are culled annually and replaced with 2-year-olds. To reduce milk production enough to qualify for payments may simply mean increasing the culling rate to 35-40 percent.

Crowley estimtes that milk production in more than half the herds in the state could be reduced by the required 5-30 percent simply by culling "borderline" cows, cows which couldn't be culled previously without reducing cash flow.

Dairy farmers who must reduce herd size anyway are in the best position to benefit from the program, including farmers who plan to retire and those who have to cut back due to illness or labor shortage.

The program is also an excellent chance to rebuild herds with poor production per cow (12,000 pounds or less for Holsteins) and an opportunity to cut out-of-pocket expenses for farmers who buy feed or are short of feed.

Many other farmers will probably find it pays to participate in the program. Farmers with cash-flow problems and debt payments should consult with their lending institutions before making a decision.

There's less incentive to participate for farmers with good herds who plan to stay in business and who have no other use for farm feeds. Dairy farmers who significantly increased production during 1983 might run into cash-flow problems if they cut production below base levels, Crowley says.

However, relatively few farmers fall into those categories.

Dairy farmers should visit Agricultural Stabilization and Conservation Service (ASCS) offices as soon as possible to establish base production levels, even if they haven't decided to sign up. This allows ample time to answer any questions, particularly if state or regional offices must be involved.

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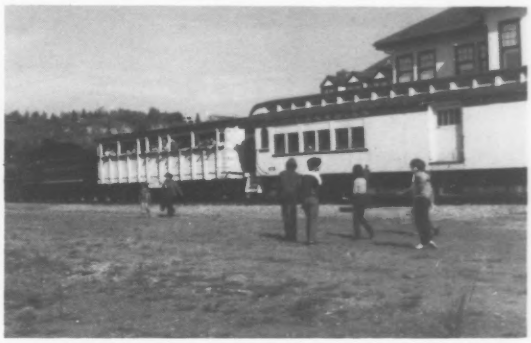
During the 71st Annual Meeting of the IAMFES to be held in Edmonton, Alberta, August 5-9, 1984, you'll have the opportunity to step back in time more than one hundred years, to experience what life used to be like in frontier and pioneer days - and learn about those who made Edmonton the vibrant, vital city that it is today. The sights and sounds of the past are part of the atmosphere at Fort Edmonton Park where you will stroll down the boardwalk of 1885 Street, tour a real frontier fort, ride on an authentic steam driven train, and top off the evening with a barbequed dinner of world-famous Alberta beef. Then wake up the next morning to a Klondike Breakfast held in retrospect of the Gold Rush of yet another era in Edmonton's history. You - and your family - are sure to have a wonderful time. Join us in Edmonton in '84!



New Product News

The products included herein are not necessarily endorsed by Dairy and Food Sanitation

SURGE Introduces the InFARMation Feed Manager

•Babson Bros. Co., builder of SURGE Dairy Farm Equipment, introduces the InFARMation Feed Manager, a revolutionary farm-tested computer-operated herd management system.

The SURGE InFARMation Feed Manager feeds cows automatically, helping to boost milk production and lower total feed costs. The system is written in easy-to-use simple english and requires no programming knowledge. They key to the Feed Manager is "Auto-continuous Update," which plots a lactation curve for each cow in the computer memory, and adjusts feeding allotments both daily and automatically, up or down, for each day of her lactation.

The system is a full-fledged computer with a TV-like screen, allowing dairymen to set all the guidelines for his own system. Challenge feeding and separate diets for cows in late lactation, over-conditioned or even dry are standard. Lead-feeding and beef-cow feeding are included.

The SURGE InFARMation Feed Manager will handle up to 48 feeding stations and includes a 64K computer, a printer that prints reports, a wall-mounted control unit, heavy-duty galvanized feed stations, InFARMation neck tags and special software programs and supplies.

At the heart of the system is a special sealed electronic cow tag that never has to be removed or replaced. "The tag has greater flexibility, reliability and a wider range of sensitivity than any other currently on the market," says Identification Devices, Inc., of Westminister, Colorado, builders of the tags for SURGE. This readily adapts it to parlor use, and allows for future expansion. For more information, contact your local SURGE dealer or write Babson Bros. Co., 2100 S. York Rd., Oak Brook, IL 60521.

Surge InFARMation System

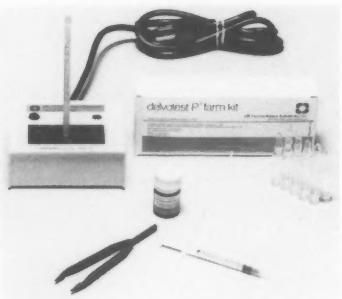
GB Fermentation Introduces New Farm Kit

•A new, inexpensive Delvotest P Farm Kit for on-the-farm determination of antibiotic residues in milk has been announced by GB Fermentation Industries Inc., Charlotte, NC.

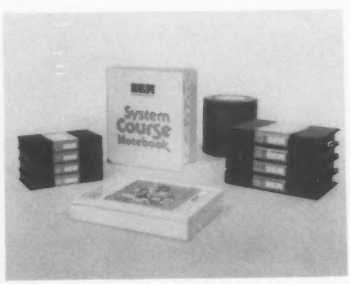
Delvotest P is a simple and reliable test for assuring a milk supply is free of antibiotic residues. Unlike tests that are specific only for penicillin, Delvotest P detects virtually all antibiotics. The test has been used by U.S. dairies and milk processors since 1975.

Delvotest P requires no special training to use. It yields easily interpreted and conclusive readings.

The new Farm Kit version has everything needed to test 10 milk samples. The only other equiment needed is a low-cost test heater. Farm Kits and heaters are available from dairy co-ops and dairy suppliers. Information about Delvotest P can also be obtained from the manufacturer, GB Fermentation Industries, Inc., PO Box 241068, Charlotte, NC 28224.



Delvotest P Farm Kit



NEM Sanitation Course

National Education Media Introduces New Course

•National Educational Media, Inc. (NEM), the world's leading producer of audio-visual training programs for the foodservice industry, has created a new, eight-program Sanitation/Hygiene Course for Foodservice Personnel.

Programs in this course stress the key responsibility of each foodservice employee -- in the kitchen and dining room alike -- for protecting the health of guests. The course provides a complete Sanitation/Hygiene and Public Health curriculum by covering topics ranging from the biological reasons for sanitation procedures to the importance of personal grooming and cleanliness.

At the heart of the course are new versions of the two top-selling motion pictures ever produced on the subject: "Sanitation and Hygiene: Why the Importance?" and "Sanitation and Hygiene: Basic Rules." The next two programs feature valuable general lessons for kitchen personnel on rodent and insect control and the care and cleaning of kitchen equipment. Two additional programs are directed specifically at those kitchen personnel responsible for the operation of dish machines and for the handwashing of kitchen utensils and glassware. The next program spells out basic sanitation and hygiene responsibilities for food servers.

Rounding out the course is a program that shows all foodservice personnel how to maintain standards of personal grooming and hygiene.

According to NEM president Jack Copeland, "the first rule of foodservice is: 'keep it clean.' For nearly two decades our programs have been driving home this vital message to foodservice employees and students throughout the world. It's a practical, universal message that cannot be compromised by any successful foodservice operation."

A NEM System Course Notebook integrates all of the programs in the curriculum. This notebook brings together the Study Guides, Leader's Guides and Lesson Plans for each program. It also funishes complete instructions for administering the entire course, in either motion picture, videocassette, filmstrip or slide-tape versions.

Customers of the course's programs include foodservice operations, schools and hospitals. In addition, health departments have used the programs extensively to show these organizations recommended sanitation and hygiene procedures.

Additional information on this course and other foodservice training programs can be obtained by contacting National Educational Media, Inc., 21601 Devonshire Street, Chatsworth, CA 91311. 213-709-6009.

New Tank Cleaning Machine from Toftejorg, Inc.

•Toftejorg, Inc. of Staten Island, New York, who have designed and manufactured tank cleaning machines worldwide for over 25 years, introduce their new model T-2000.

Up until now the inside of small tanks, process tanks and containers had to be cleaned manually because sanitation by mechanical cleaning technology only provided for large tanks of 2,000 gallons or more. Now, Toftejorg, Inc. has made it possible for industries such as food, chemical and beverage, etc. to utilize the T-2000 and avoid the costly, and where chemicals are used, dangerous aspects of manually cleaning small tanks and vessels.

The model T-2000 cleans 100% of the tank surface with its adjustable length feature, rotating nozzles and its time proven jet pattern, typical of larger machines. This new model saves water through a 3/4 inch connection and will fit a 2-3/4 inch port opening.

Simple construction using only 4 moving parts of AISI - 316 Stainless Steel and Teflon provide for long, corrosion resistant and sanitary performance.

A choice of electric or pneumatic drive units are available.

For more information contact: Jack MacDougall, Toftejorg, Inc., 3075 Richmond Terrace, PO Box 118, Staten Island, NY 10303. 212-442-8190.

Water QA-1 Analyzer

•A series of application highlights that illustrate rapid, accurate HPLC methods for the analysis of fat and water soluble vitamins in cereals, flour products, vegetable products, pet foods, and dairy products are being offered by Waters Associates of Milford, Massachusetts

Waters Application Highlights feature HPLC analyses of A, B, C, D, and E vitamins in various food matrices using Waters QA-1 Analyzer - a new easy-to-use HPLC system providing simple, push-button operation. The system performs the analyses in less than fifteen minutes with precision as high as ±3%, and provides a permanent record of results presented in international units or as required.

The application highlights provide complete operating conditions and supplies required to complete the analysis on Waters QA-1 Analyzer. To perform the analyses, operators need only load the prepared samples, set the number of samples to be analyzed on a digital thumbwheel, and press the start button. Sample preparation is usually as simple as extracting and filtering the sample.

For free copies of Waters QA-1 Analyzer Application Highlights, contact Tom Ricci, Waters Associates, 34 Maple Street, Milford, MA 01757. 617-478-2000.

'Insta Ice' Dry Ice Machine

•Industrial grade solid dry ice in 1 and 2 pound blocks can now be made with just this machine and readily available liquid CO_2.

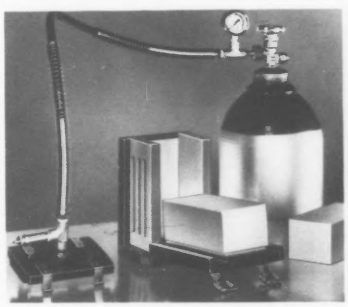
Insta Ice requires no batteries or electricity and eliminates expensive delivery of commercial dry ice.

Outstanding advantage is no compacting necessary before using the product. Solid CO_2 is ready for use as it comes from the machine. Only 60 seconds are required to produce it.

Size of blocks is approximately 7" x 3" x 3". As many as 18 one pound blocks can be produced from a single cylinder. Machine weighs only 5 lbs., measures 8" x 6" x 5", and is equipped with a pressure gauge and safety relief valve built into the filling line.

Clinical research, science and public health labs as well as industrial R & D, hospitals, medical centers and detached field operations can now have immediate dry ice without delivery delays. Biological uses include: tissue freezing, cold baths, shell freezing, pharmaceuticals production, and dry iced specimens for shipping. Industrial manufacturing requiring cold treated metals, cryogenic procedures, rivet freezing and food marketing are among some of the other applications for dry ice produced by this machine.

For more information contact: Polyfoam Packers Corp., 2320 S. Foster Ave., Wheeling, IL 60090.



Insta Ice Machine

Ladish Co. Introduces the Series LR Pump

•Ladish Co., Tri-Clover Division, Kenosha, WI, has introduced a new line of stainless steel positive displacement pumps.

Designated as Series LR, the new pump can handle capacities to 300 GPM or 200 psi. It is available in four models, with Tri-Clamp, flanged or threaded ACME Bevel Seat port connections in sizes 2" to 6".

Single and double seals, currently offered in seven different material combinations, give the Series LR the added versatility to handle a wide variety of processing applications.

Heavy duty construction features, including larger diameter shafts, a superior crown-to-pitch timing gear design, and LR's exclusive interlocking double nut rotor retaining system assures longer life and less downtime.

Tri-Clover Series LR features a unique shaft sleeve cartridge assembly, which allows the user to replace a damaged shaft quickly and easily. This assembly also enables a change from upper to lower shaft drive quickly and in-place. For added versatility, either port of the Series LR pump casing can function as inlet or outlet. These quick-change capabilities can result in less downtime for maintenance and more trouble-free processing time.

The Tri-Clover Series LR pump, of corrosion resistant type 316 Stainless Steel, is available with a variety of drive units. Side-mounted models are also available. For more information, send for Bulletin LR-83 from Ladish Co., Tri-Clover Division, 9201 Wilmot Road, Kenosha, WI 53141.

Brinkman Instruments' Epson HX-20 System

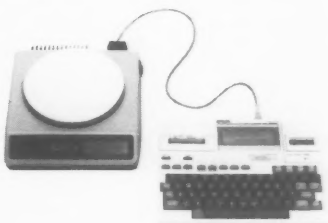
•Brinkmann Instruments Co., Division of Sybron Corporation, announces the introduction of the Epson HX-20 System for Sartorius Electronic Balances.

The system includes an Epson HX-20 computer; interface for connection to Sartorius MP6, MP7 or MP8 electronic balances; and standard programs for statistics, net weight or counting.

All three programs are designed to eliminate difficult operating procedures, and basic instructions are displayed on the computer's easy-to-read screen. Entries and calculations are printed immediately on the built-in microprinter, thus eliminating the need to spend hours tabulating statistical results.

Because the HX-20 computer is small enough to fit in a briefcase and requires no power cord, calculations can be performed virtually anywhere, making the system ideal for such applications as pharmaceutical tablet or capsule control, production net/fill control, and parts counting.

For more information, request product bulletin PB-391 from Brinkmann Instruments Co., Cantiague Rd., Westbury, NY 11590. 800-645-3050 or 516-334-7500.



Epson HX-20 System

Food Science Facts
For The Sanitarian

Robert B. Gravani
Cornell University
Ithaca, NY

MOLDS

Molds are the most widely encountered microorganism and have been seen growing on the surface of a wide variety of foods and other items. They are found everywhere; but soil, air, water and decaying food and other organic matter are the prime sources of molds. They are easily spread by air currents, insects and animals. Like bacteria and yeasts, molds are often involved in food spoilage and are a nuisance in the food industry, but they also have many beneficial uses.

GROWTH

Molds are larger than bacteria and yeasts and their fuzzy, cottony or velvet-like appearance is easily visible to the naked eye. Molds do not grow as single cells, but are groups of cells that are very complex in structure. They are made up of hair-like filaments that form tangled masses which spread rapidly on food surfaces. These filaments send up fruiting bodies that produces spores.

Unlike bacterial spores that are formed mainly when conditions are unfavorable, mold spores are the primary means of reproduction. Mold spores are small and light weight and are produced in large numbers. They detach from the fruiting bodies and are carried by air currents to locations where favorable conditions allow new molds to grow. These spores can remain suspended in the air for long periods and can travel great distances. Most molds that are important to the food industry reproduce by forming spores.

APPEARANCE

Molds have a variety of appearances; some are loose and fluffy, while others are compact; some are dry or powdery while others are wet or slimy. Most molds are white, dark or smokey in color, while spores are usually brightly colored and are green, yellow, blue-green, orange, pink, brown, purple, gray or black.

The appearance of a mold, both with the naked eye and under a microscope, is used as a means of identification.

A microscopic view of a mold typically associated with food is shown below:

FACTORS AFFECTING MOLD GROWTH

1) Water -- molds require less moisture than bacteria and yeasts to grow. Spores are resistant to drying and can survive for long periods of time.

2) Food/Nutrients -- molds are very hardy and can grow in situations where bacteria can't survive. Molds can utilize many kinds of foods from simple sugars to complex carbohydrates like starch and cellulose. They also need nitrogen and trace elements for growth. Some molds require vitamins.

3) Oxygen -- most molds require a plentiful supply of oxygen to grow. Molds are referred to as strict aerobes.

4) Temperature -- molds can grow over a wide temperature range from 14°F to 131°F, with the optimum for most molds being between 64°F - 86°F. A number of molds grow well at refrigerator temperatures and cause spoilage of foods kept in cold storage. Molds can be easily destroyed by a milk heating process where temperatures of 140°F or higher are reached.

5) pH -- most molds can grow over a wide pH range (pH 2 to 9.0) but the majority grow best in acid conditions.

Molds begin to grow more slowly than bacteria or yeasts, so when conditions favor all three types of microorganisms, molds don't grow very well. Once mold growth begins, however, it usually is quite rapid.

TYPES OF MOLDS

Since molds are so widely distributed in nature and are of importance and concern to the food industry, some of their properties and characteristics will be mentioned.

BENEFICIAL MOLDS

Molds are used in the manufacture of many foods and several food ingredients. Several types of cheeses such as Blue, Roquefort, Camembert, and Brie are ripened by molds. Oriental foods such as soy sauce, meso, sonti and tempeh are produced by molds. Molds are also used in the production of food ingredients (such as citric acid in soft drinks and amylase for breadmaking), industrial chemicals and enzymes. Specific molds are responsible for the commercial production of penicillin and other antibiotics which have been of great value to medical science.

SPOILAGE MOLDS

Many types of molds are involved in food spoilage and grow on bread, cheese, fruits, vegetables, starchy foods,

preserves, grains and a wide variety of other products. The food industry often adds compounds to their products to inhibit mold growth.

MYCOTOXINS

Some molds can cause severe problems when they grow on foods. Certain molds produce poisons called mycotoxins which have been detected primarily in grains and nuts. These mycotoxins can cause unnatural changes in plants, animals, humans and microorganisms; some are thought to cause cancer. Prevention of growth on foods by these specific types of molds is the best way to avoid mycotoxin formation.

Lactation Treatment Not Effective
And More Expensive

Dairymen probably treat lactating cows more often than they realize, says L. H. Schultz, University of Wisconsin dairy scientist. Treatment during lactation also is less effective and more expensive than they think. Schultz says that dairymen who don't record treatments underestimate how often they treat cows for mastitis.

Thirty-six dairymen enrolled in the Wisconsin DHI somatic cell program said they treated an average of 3.5 percent of their cows each month. A realistic goal for most dairymen might be treating no more than 3 percent of the lactating cows per month. Chronic mastitis can increase the treatment.

A Wisconsin study found that 46 percent of the cows treated for mastitis were treated once, 32 percent, twice; and 22 percent, three or more times. Most were treated in early lactation with 63 percent of those treated during the first two months of lactation and most of those during the first month.

Only 40 percent of the treated cows returned to a normal cell count on the next DHI test. Somatic cell counts tended to be higher as cows required more treatments.

Treating lactating cows based only on high somatic cell counts isn't recommended although treatment during lactation is justified for clinical mastitis. Cost of antibiotics and discarded milk totaled almost $40 per treatment series.

Dairy Quality

by **Darrell Bigalke,** *Food & Dairy Quality Mgmt., Inc., St. Paul, MN*

THE EFFECT OF PSYCHROTROPHIC BACTERIAL GROWTH IN RAW MILK AND ITS EFFECT ON QUALITY AND YIELD OF CULTURED DAIRY PRODUCTS

A high quality cultured dairy product must possess several attributes. Specifically, it must be safe, legal, nutritionally complete, have maximum attainable shelf-life, and desirable sensory properties. To obtain products of this quality, cultured product manufacturers must implement a quality assurance program that includes ingredients specification and control, processing control, and distribution control. A necessary component of the ingredients control must include monitoring and controlling the quality of raw milk received at the plant. To assure high quality raw milk, psychrotrophic organisms must be controlled. Changes in production procedures with longer transportation requirements, every other day pick-up on the farm, and prolonged storage at the processing plants have created the potential for large populations of psychrotrophic bacteria in raw milk. However, if effective sanitation practices and adequate refrigeration are maintained, this potential problem can be controlled.

When large numbers of psychrotrophic bacteria are encountered in milk, they are normally gram negative rods. These bacteria are usually from the genera *Pseudomonas, Alcaligenes, Aeromonas, Flavobacterium* and *Achromobacter*. These organisms are capable of producing proteolytic and lypolytic enzymes which catalyze the breakdown of protein and milkfat leading to undesirable off-flavors. The specific quality defects that occur are bitter, rancid, putrid, fruity, and unclean flavors, as well as physical defects such as slime and ropiness. Once these defects are present in milk, pasteurization and processing will not remove them. In addition, literature (1,2,4) indicate that these organisms are capable of producing heat stable enzymes which can lead to development of off-flavors in processed products even after processing.

While most of the work concerning psychrotrophic spoilage of dairy products is concerned with post-process contamination and subsequent growth of contaminants, some research is available on the impact of psychrotrophic raw milk organism growth on cultured product quality. Cousin and Marth (2,3) have recently completed a series of studies addressing this potential quality problem. This research was conducted by inoculating skim milk with psychrotrophic organisms, allowing them to grow for 3 to 5 days at 4.4C (40F), and processing this inoculated milk into cultured products. Factors studied on these products included yield, sensory quality, and processing parameters.

Table 1 shows the initial populations and those at 3 and 5 days of two *Pseudomonas* species and one *Flavobacterium* when stored at 4.4C (40F). *Pseudomonas* and *Flavobacterium* are common gram negative rods found in water, soiled dairy equipment, and other environmental sources. High populations of these organisms can be found in raw milk when care in handling and storage are not practiced.

When cottage cheese was made from milks supporting psychrotrophic growth and stored for extended periods, the yield was determined to decrease. As an example, cottage cheese made from fresh milk had a yield of 18.4%. When no bacteria was added, but when milk was stored for 5 days at 4.4C, the yield was 16.6%. Finally, when milk was inoculated with *Pseudomonas* Nos. 13 and 26 and *Flavobacterium* No. 26 and stored for 5 days at 4.4C, yields were reduced to 15.9%, 12.7% and 17.0% respectively. Yields from milk stored for 3 days at 4.4C were not significantly different than controls.

Table 2 shows the organoleptic qualities of yogurt and cottage cheese from the same incubated milks. The data in Table 2 is on milk stored for 3 days, since milk stored for 5 days was unacceptable when evaluated by a taste panel.

Incubation with psychrotrophic bacteria had the following effect on cultured products...1) proteolysis was quite evident in all milks pre-incubated with *Pseudomonas,* 2) the pH values of cottage cheese and yogurt were slightly lower when products were made from incubated stored milk, 3) the percent moisture in cottage cheese decreased with increased storage time, 4)the processing times decreased with an increase in storage time and 5) curd tension increased with an increase in storage time of milk.

In summary, this work indicated that the percent yield and percent moisture of cottage cheese is dependent upon the length of storage of raw milk -- longer storage resulting in decrease of both. Cottage cheese made from milk pre-incubated with psychrotrophic bacteria were unacceptable to taste panelists. Also, yogurt made from pre-cultured milk was found unacceptable when *Pseudomonas* No. 13 and *Flavobacterium* No. 26 were evaluated. The cultured dairy manufacturing plant that is concerned with the quality of

TABLE 1. *Number of psychrotrophic bacteria in milk used to manufacture cottage cheese and yogurt when* Pseudomonas spp. *(No. 13 and 36) and* Flavobacterium sp. *(No. 26) were evaluated*.*

	Initial		After Storage	
	3 Days	5 Days	3 Days	5 Days
No Bacteria Added (Fresh)	1,000	800	–	–
No Bacteria Added (Stored @ 4.4C)	1,000	800	6,600,000	51,000,000
Pseudomonas No. 13 (Added & Stored @ 4.4C)	7,800	5,200,000	19,000,000	330,000,000
Flavobacterium No. 26 (Added & Stored @ 4.4C)	10,000	390,000	45,000,000	21,000,000
Pseudomonas No. 36 (Added & Stored @ 4.4C)	2,000,000	470,000	68,000,000	930,000,000

* All values are average of duplicates from one trial. Data from Reference 2.

TABLE 2. *Sensory evaluation for cottage cheese and yogurt made from milks which supported growth of* Pseudomonas spp. *(Nos. 13 and 36) and* Flavobacterium sp. *(No. 26).*

	Products from milk at 3 days at 4.4C (Desirability)	
	Cottage Cheese	Yogurt
No Bacteria Added (Fresh)	5.17	4.36
No Bacteria Added (Stored @ 4.4C)	3.89	3.78
Pseudomonas No. 13 (Added & Stored @ 4.4C)	3.48	3.43
Flavobacterium No. 26 (Added & Stored @ 4.4C)	2.81	3.28
Pseudomonas No. 36 (Added & Stored @ 4.4C)	2.97	4.06

Scale: 1 = dislike extremely, 9 = like extremely for overall desirability. Date from Reference 2.

their processed products and of the economic advantages of maximum yield must monitor and control the quality of the raw milk supply.

(1) Adams, D.M., J.T. Barach, and M.L. Speck. 1975. Heat resistant proteases produced in milk by psychrotrophic bacteria of dairy origin. J. Dairy Sci. 58:828-834.

(2) Cousin, M.A. and E.H. Marth. 1977. Cottage cheese and yogurt manufactured from milks precultured with psychrotrophic bacteria. Cultured Dairy Prod. J. 12:15-18, 30.

(3) Cousin, M.A. and E.H. Marth. 1977. Psychrotrophic bacteria cause changes in stability of milk to coagulation by rennet or heat. J. Dairy Sci. 60(7):1042-1047.

(4) Mikolajcik, E.M. 1979. Psychrotrophic bacteria and dairy product quality 1. Major organisms involved and defects produced. Cultured Dairy Products J. 14:6-10.

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US Dept. of Agriculture
Dale City, VA

Book Reviews

Methods in Environmental Virology, edited by Charles P. Gerba and Sagar M. Goyal, Marcel Dekker Inc., New York, 1982.

The stated purpose of this text was to put into one document a review of available methodologies for studying viruses found in the environment. To do this the editors put together material contributed by twelve renown environmental virologists. The emphasis of the presentations was on strategies for isolating viruses from various environments. The text is divided into thirteen sections. Each section written by one or more authors independent of other material presented. The editors have done an excellent job of arranging the material into a logical readable manner. Each section has a list of references which is very comprehensive and should satisfy most readers who quest for additional sources of information.

The first section introduces the importance of studying viruses in the environment. Section two reviews the various laboratory methods for the growth and detection of animal viruses. Included are discussions of animal and egg culture systems, assay of viruses in cell cultures, neutralization tests, virus identification using immunofluorescene and immunoperoxidase techniques and by electron microscopy. Radioimmunoassay (RIA) and enzyne-linked immunosorbent assay (ELISA) techniques for virus detection are also presented.

Section three reviews the importance of preservation of environmental samples. Sections four and five present detailed, exceptionally well written material for concentration of viruses from water samples using membrane filter methods and non-microporous filter methods. The reference sections provide a bonanza of resource material for anyone wanting to know about collecting viruses from water.

Sections six, seven, eight and nine discuss detection of viruses from various areas including; soil and aquatic sediments, associated with sludge particles, in solid waste landfill leachages and on fomites. Each section presents very up-to-date methodologies and strategies on how researchers can detect viruses in the mentioned environmental settings. All have exceptional lists of references.

Sections ten and eleven discuss the detection of viruses in food and shellfish. These areas are of special interest to the food sanitarian. Those who wish to update themselves on problems and methods on detection of viruses in food would find these two sections of interest. The number of references provided at the end of these sections would keep one busy for weeks reviewing the latest research findings in this area.

Section twelve reviews methods of characterization of virus aerosols. The importance of viruses being transmitted by the action of aerosols is of great public health concern. Hospitals have long been concerned with airborne spread of nosocomial infections. This section presents an excellent review of the occurrance and significance of airborne viruses. The last section in the book deals with the important concept of evaluating chemical disinfectants for virucidal activity. This is an important concern to those evaluating disinfectants and utensil sanitization.

The articles presented in this text, *Methods in Environmental Virology,* are excellently written by many of our foremost environmental virologists. The book would be an excellent university textbook and would be an extremely useful reference book for practicing sanitarians who wish to keep current in the study of environmental virology.

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Johnson City, Tennessee 37614-0002

Food Irradiation Now Proceedings of a Symposium Martinus Nijhof/ Dr. W. Junk Publishers, The Hague

The proceedings as published do not indicate an editor; however, the material has been carefully assembled and presented in a commendable form.

The symposium was held in Ede, the Netherlands, and the presentors were from The Netherlands or have been closely associated with their national program, which includes the international facility for food irradiation technology. The presentors are recognized internationally as outstanding in their field.

The topics considered inherent contaminants of public health significance in foods, the potential for irradiation to alleviate these problems, the technology of irradiation processing on an industrial scale, governmental control of irradiation processing and consumer reaction to irradiated foods. The coverage of these subjects was very good and considered both national and international implications.

The general conclusions were that irradiation processing has potential for food preservation on an industrial scale and improved public health protection. Public apprehension and regulatory reluctance to accept the process are the major deterents to widespread adoption of the process.

In addition to the above mentioned symposium presentation, the book contains a report of the "Joint FAO/ IAEA/WHO Expert Committee on the Wholesomeness of Irradiated Food." This segment represents a position paper of some of the most authoritative scientists in the world. Anyone concerned with the suitability of irradiated food for human consumption should read this report.

"Food Irradiation Now" is worthy of reading by anyone interested in potential processes in the food industry.

R. Burt Maxcy, Professor
Department of Food Science & Technology
University of Nebraska
Lincoln, NE 68583

Developments in Dairy Chemistry-I, P. F. Fox.

The title of the book itself is the only fault which can be found with Developments in Dairy Chemistry - I edited by P.F. Fox. The book concentrates on the proteins of milk and not on dairy chemistry as a whole as the title implies. This concentration, however, gives the reader a wealth of information about the chemistry and composition of the dairy proteins. The editor is to be commended for having brought together the expertise of many of the foremost dairy protein chemists in one book.

The primary structure of the milk proteins and variations in their structure caused by genetic variants are the subject of chapter one. Chapter two details the association of the casein proteins in the casein micelle and critiques the various models proposed for this association. The similarity of the milk proteins of various mammals including man is the topic of chapter three. In chapter four the subject of the biosynthesis of the milk proteins is covered from the amino acid ratios needed through the assemble and excretion of the proteins from the mammary cell. Various conditions which lead to alteration of the proteins and the casein micelle in particular are the subjects of chapters five through eight. Chapter five is devoted to the enzymatic coagulation of the proteins. The mechanism of coagulation is detailed and the effects of various enzymes used for coagulation discussed. Heat induced coagulation and how various parameters affect it is the subject of chapter six. The complex phenomenon of age gelation of sterilized milk is the topic of chapter seven. Changes in the proteins during raw bulk storage of milk are dealt with in chapter eight, especially the effects of indigenous and bacterial proteinases. Switching from alterations of the proteins, chapter nine is devoted to a discussion of the nutritional quality of the milk proteins. The final three chapters deal with the technology of isolating various protein fractions and the use of the milk proteins in processed foods. Isolation of the casein proteins and the production of various casein products is the subject of chapter ten. Chapter eleven deals with the whey proteins in much of the same manner as chapter ten dealt with the caseins. The final chapter discusses the functional properties of the milk proteins which make them good ingredients in processed foods.

The various chapters are highly detailed and specific but do contain enough background and supplemental information to allow the non-expert to follow the discussion. The chapters were also very well referenced and thus could serve as a good resource to anyone wishing to explore an area more deeply. The authors were quite frank in their assessment of the knowledge of a particular subject.

Overall, this book should be of value to anyone working or interested in the area of dairy protein chemistry.

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Department of Food Science and Nutrition
1334 Eckles Avenue
St. Paul MN 55108

Micropollutants in River Sediments, A Report on the WHO Working Group, by EURO Report and Studies, WHO, 1982.

Micropollutants in River Sediments is a report of the working group on Health Implications of Accumulation of Micropollutants on River Sediments which convened in Trier, Federal Republic of Germany in August, 1980. The meeting was sponsored by the WHO Regional Office for Europe, headquartered out of Copenhagen, Denmark. The report is concerned about treated and untreated industrial and municipal effluents which are being discharged in densely populated parts of Europe. The report concentrated on cadmium, lead, mercury and polycyclic aromatic hydrocarbons (PAH) as contaminants in the aquatic environment. The text lists 225 references which were used in preparing the report. Thirty two renown European and American Scientists participated in the conference.

The text is divided into several sections. Three sections constitute the major portion of the book. The first of these sections reviews Pathways of Pollutants. It discusses how pollutants are transported, the accumulation of sediments and ends with a review of the intercharge of pollutants between sediment and water. The second major section deals with sampling and analysis of pollutants in sediments and water. An interesting review concerning determination of speciation involving biological availability and partitioning is presented. The third major section deals with exposure of man to pollutants in aquatic sediments. The report recognized the consumption of fish as the major source of dietary mercury. The major sources of dietary cadmium are plant foods such as wheat. A method proposed to reduce cadmium intake was to set limits for cadmium in irrigation water. Lead was rarely found in significant concentrations in surface waters. When it was found it was associated with soft low pH water and leaching from the distribution system. Industrial and community wastewater, urban runoff and disposition of aerosols were the major sources of PAH in surface water pollution. Higher concentrations of PAH were found in particulate matter rather than dissolved in water.

The report concludes that "cadmium is of particular importance in the terrestrial environment, as agricultural land may be contaminated by irrigation and application of river sediments, natural processes and human activities." Also it emphasizes the need to continue studying the levels of metals and PAH in sediments to assess the pollution levels of the aquatic environment.

The text would be an important reference source to those involved in the research or teaching of health implications associated with metal and PAH pollutants in river sediments.

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JFP Abstracts

Abstracts of papers in the March Journal of Food Protection

To receive the* Journal of Food Protection *in its entirety each month call 515-232-6699, ext. A.

Production of Rabbit Antisera to the Staphylococcal Enterotoxins, Ruth N. Robbins and Merlin S. Bergdoll, Food Research Institute and Department of Food Microbiology and Toxicology, University of Wisconsin-Madison, 1925 Willow Drive, Madison, Wisconsin 53706

J. Food Prot. 47:172-176

An immunization method for production of antiserum to the staphylococcal enterotoxins in rabbits is presented. The bleeding schedule is tailored to the enterotoxin type. About 0.5 mg of staphylococcal enterotoxin is used per rabbit and serum harvest begins 11 weeks after the initial injection. Proposed are subcutaneous injections of 1, 3, 10, 20 and 30 μg of toxin with Freund's adjuvant on days 0, 3, 8, 24 and 28, respectively; and five weeks later, injections of 50, 100 and 300 μg on days 0, 3 and 8, respectively. Serum harvest ranges from a 4-week period for enterotoxin A to 8 or more weeks for enterotoxin E. Immunizations with all toxin types using the proposed or similar injection programs produced antibody titers from about 20 to over 100. Individual variation in response of rabbits in the same group was generally 3- to 5-fold, and in extreme instances, 10-fold. Immunization experiments were augmented by booster experiments in which the rabbit variable was held relatively constant by sequentially testing different schedules and doses on the same group of animals.

Microbiological Quality of Commercial Tofu, T. G. Rehberger, L. A. Wilson and B. A. Glatz, Department of Food Technology, Iowa State University, Ames, Iowa 50011

J. Food Prot. 47:177-181

A study was done to investigate the microbiological quality of commercial tofu available in local retail outlets. A sampling method was first developed to obtain accurate and representative microbial counts of individual pieces of tofu. Plate count determination of total aerobic organisms, psychrotrophs, coliforms, sporeformers, yeasts and molds, and staphylococci were made on 60 tofu samples (representing three lots each of four different brands) obtained within 24 h after delivery to the retail store. In addition, for two brands that provided manufacturer's pull dates, the same microbial counts were obtained for samples stored in the laboratory at 10°C until the pull date. Of the tofu sampled immediately after purchase, 83% of the lots tested had total counts greater than 10^6 colony-forming units (CFU)/g and psychrotrophic counts greater than 10^4 CFU/g. In addition, 67% of the lots tested had confirmed coliform counts greater than 10^3 CFU/g. Very low levels (less than 10 CFU/g) of all other microbial groups tested for were found in the majority of lots. Samples held until the manufacturer's pull date contained higher total and psychrotrophic counts but lower or stable counts of other organisms compared with samples tested immediately after purchase. To improve the microbiological quality of tofu, processors need to reduce initial loads by improving sanitation and processing techniques, and retailers should provide more consistent and colder refrigerated storage.

Effects of Sodium Tripolyphosphate and Ascorbic Acid Added with Glandless Cottonseed Flour to Ground Beef, K. S. Rhee and G. C. Smith, Department of Animal Science, Texas A & M University, College Station, Texas 77843

J. Food Prot. 47:182-188

Sodium tripolyphosphate (STP; 0.25%) or 0.05 or 0.10% ascorbic acid (AA) was added in combination with 3% defatted glandless cottonseed flour (GCF) to ground beef containing 22% fat and 0, 0.5 or 2.0% added salt. Patties made from the mixes were stored at 4 or -20°C, or at -20°C followed by storage at 4°C. Refrigerated patties or frozen-and-refrigerated patties containing GCF plus AA or GCF plus STP plus AA had higher ($P<0.05$) Hunter "a" values (redness) than those containing GCF alone or GCF plus STP. Frozen patties with GCF plus STP had higher ($P<0.05$) "a" values than those having other antioxidant treatments. STP and/or AA used in conjunction with GCF had no advantage over use of GCF singly for inhibiting lipid oxidation.

Fate of Mycotoxins During Processing of Foodstuffs III. Ochratoxin A During Cooking of Faba Beans (*Vicia faba*) and Polished Wheat, A. A. El-Banna and P. M. Scott, Food Research Division, Health Protection Branch, Health and Welfare Canada, Ottawa, Ontario, Canada K1A 0L2

J. Food Prot. 47:189-192

The fate of ochratoxin A during cooking of faba beans and polished wheat was studied by addition of crystalline toxin before cooking in water at a level of 125 ng/g dry faba beans or raw polished wheat. Determinations were made by reversed-phase high performance liquid chromatography (HPLC) and the simple, sensitive, precise and economical method used gave a detection limit of about 0.7 ng/g. Average destruction of 16 and 20% of ochratoxin A occurred during cooking of faba beans by two methods, whereas an average of only 6% of the toxin added was destroyed after cooking of polished wheat. Thus the destruction of ochratoxin A by cooking of contaminated faba beans or polished wheat is not possible.

Nutritional and Bacteriological Characteristics of *Tsire*-Type *Suya*, A Popular Nigerian Meat Product, John O. Igene and Egerton O. Abulu, Department of Food Science and Technology, University of Maiduguri, P. M. B. 1069, Maiduguri, Nigeria

J. Food Prot. 47:193-196

Tsire products were obtained from a number of retail producers (6 to 40) in Maiduguri, Nigeria, and examined for unit weight variations, nutrient composite changes due to processing and for their microbiological quality. Unit retail weight differed significantly ($P<0.01$) among producers. Each 116-g mean retail piece of finished product contained 68 g of protein and 19 g of fat. Total bacterial and coliform counts in *tsire* products exceeded acceptable limits for delicatessen items, suggesting unsanitary conditions. The level of organisms in the products was significantly ($P<0.01$) related to handling at the retail level. Identification of bacterial genera in *tsire* revealed the presence of *Bacillus, Streptococcus, Staphylococcus, Escherichia, Proteus, Pseudomonas* and *Klebsiella.*

Lactic Acid Production in Milk Containing Cleaning or Sanitizing Compounds, Michael B. Liewen and Elmer H. Marth, Department of Food Science and The Food Research Institute, University of Wisconsin-Madison, Madison, Wisconsin 53706

J. Food Prot. 47:197-199

Sterile reconstituted nonfat dry milk containing 0.1% (v/v) each of 19 cleaning or sanitizing compounds intended for use on dairy farms or in milk factories was inoculated with *Streptococcus lactis* 4175, *Streptococcus cremoris* C-13, *Streptococcus thermophilus* ST4 or *Lactobacillus bulgaricus*. Milk then was incubated at 32°C for 12 h and pH and titratable acid were determined. Five products (alkaline inflation cleaner, hypochlorite sanitizer-farm use, isopropanol udder wash, ammonium chloride detergent-factory use, alkaline cleaner A-factory use) were inhibitory to at least three of the four lactic acid bacteria at the 0.1% concentration. These were then tested at 0.050, 0.025, 0.012 and 0.006% concentrations. Of the five products, only the isopropanol udder wash (at all four concentrations) inhibited *S. lactis* and *S. cremoris*. The isopropanol udder wash at all four concentrations and the ammonium chloride cleaner at 0.050% inhibited *L. bulgaricus*. *S. thermophilus* was inhibited by the isopropanol udder wash at 0.050%, whereas the alkaline cleaner A-factory use, at 0.050 and 0.025%, may have been mildly stimulatory to acid production by this bacterium.

Microbiological and Sensory Characteristics of Patty Formulations Containing Beef From Grass-Fed Steers and Fat Beef or Pork Trim, M. E. Chen, P. M. Davidson and M. J. Riemann, Department of Food Technology and Science, University of Tennessee, P.O. Box 1071, Knoxville, Tennessee 37901

J. Food Prot. 47:200-205

Ground meat samples were formulated which contained: (*a*) beef from grass-fed steers, (*b*) beef from grain-fed steers, (*c*) fat beef trim from grain-fed steers and beef from grass-fed steers, (*d*) fat pork trim and beef from grass-fed steers. The samples were packaged and stored in retail over-wrap, freezer wrap or a vacuum-type film. Mixing of fat from different sources generally caused no increase in numbers of microorganisms in newly formed products compared to beef from grass-fed steers. In one instance, however, the psychrotrophic count (as measured on CVT agar) of mixtures of grain-fed beef trim or pork trim and grass-fed beef was increased compared to that of grass-fed beef alone. Lipid deterioration, as measured by the 2-thiobarbituric acid test (TBA), was significantly higher for the pork trim/grass-fed beef mixture than for beef from grass-fed steers. Based upon mean scores, a consumer panel ranked the meat patties in the following order (most preferred to least preferred): all grain, grass-fed lean and grain-fed beef trim, all grass, grass-fed lean and pork trim. Results from the present investigation showed that addition of fat beef trim from grain-fed steers to beef from grass-fed steers potentially improved its palatability and may be an acceptable alternative for increasing the utilization of beef from grass-fed animals.

Preliminary Incubation Count as an Index of Raw Milk Microbiological Quality During Storage, J. J. Ryan, R. H. Gough and C. H. White, Department of Dairy Science, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, Louisiana 70803

J. Food Prot. 47:206-208

During a 5-month period, 200 raw milk samples were collected from two Louisiana milk plants. Standard Plate Count (SPC), Psychrotrophic Bacteria Count (PBC), and Proteolytic Count (PC) of each sample were initially determined, then monitored daily during a 5-d storage period at 2.2°C. As hypothesized, all bacterial counts increased during the storage period. The magnitude of the increase in bacterial numbers during storage was further investigated by dividing the milk samples into bacteriologically acceptable and unacceptable groups based on SPC or Preliminary Incubation (PI) count. An SPC of 1.0×10^5/ml and PI counts of 1.0×10^5/ml, 1.5×10^5/ml, 2.3×10^5/ml, and 3.0×10^5/ml were used to repeatedly dichotomize the 200 raw milk samples into two groups. Median SPC, PBC, and PC for each acceptable and unacceptable group were then calculated. Dichotomization based on PI counts yielded acceptable sample groups having consistently lower bacterial counts during storage than did the acceptable sample group, which resulted from the dichotomization based on a SPC of 1.0×10^5/ml. The results of this study indicated that the PI count is of considerable value for raw milk quality control.

Effect of Reduced Processing on Recovery of Foodborne Pathogens from Hot-Boned Broiler Meat and Skin, H. S. Lillard, D. Hamm and J. E. Thomson, United States Department of Agriculture, Agricultural Research Service, Richard B. Russell Agricultural Research Center, P.O. Box 5677, Athens, Georgia 30613

J. Food Prot. 47:209-212

Recovery of pathogens from breast meat, thigh meat and skin from scalded, defeathered but uneviscerated broiler carcasses with and without spray washing was compared to recovery from breast meat, thigh meat and skin from fully processed, chilled carcasses (controls). The incidence of coagulase-positive staphylococci was not significantly different on meat and skin from both uneviscerated carcasses with and without a spray washing compared to meat and skin from fully processed carcasses. The incidence of *Clostridium perfringens* was not significantly different on skin, breast and thigh meat for any of the sampling sources except that incidence on meat from control breasts was lower than on breast meat from uneviscerated carcasses without spray-washing; and incidence on meat from control thighs was lower than on meat from spray-washed, uneviscerated carcasses. *Salmonella* incidence was higher on both breast and thigh meat from fully processed control carcasses than from uneviscerated unwashed carcasses. When uneviscerated carcasses were spray-washed after defeathering, the incidence of *Salmonella* was not significantly different on breast meat, and significantly lower on thigh meat than on these meats from fully processed control carcasses. Skin from fully processed control carcasses had a higher incidence of *Salmonella* than did skin from uneviscerated, unwashed carcasses, but not skin from uneviscerated, spray-washed carcasses. Reducing the number of stages of processing significantly reduced the incidence of *Salmonella* but not of coagulase-positive staphylococci or *Clostridium perfringens*.

Isolation of *Salmonella* from Raw Chicken in Venezuela, Adalgisa Rengel and Silvia Mendoza, Department of Biological and Biochemical Process Technology, Simon Bolivar University, Box 80659, Caracas 1080, Venezuela

J. Food Prot. 47:213-216

Forty-five samples of raw chicken carcasses obtained from three poultry processing plants were examined for presence of *Salmonella* by the whole carcass rinse and skin maceration methods. Sensitivity of the selenite cystine (SC), tetrathionate brilliant green (TBG) and Rappaport (RAP) enrichment broths at 37°C and 43°C was compared following preenrichment in nutrient broth incubated at 37°C for 24 h. The rinse method and skin maceration resulted in isolation of *Salmonella* from 41 and 22 of the 45 samples, respectively. RAP incubated at 43°C resulted in higher rates of isolation of *Salmonella* than TBG and SC incubated at the same temperature. Incubation at 37°C was less productive. The sensitivity and selectivity of bismuth sulfite agar (BSA) exceeded that obtained with desoxycholate citrate agar (DCA) and brilliant green agar (BGA). With the methods and media we compared, sampling by the whole carcass rinse method and enrichment in RAP (43°C) and plating on BSA provide optimal conditions for detection of *Salmonella* in raw chicken. Eleven serotypes were identified with *Salmonella anatum* showing the highest frequency of isolation.

Performance of Several Enrichment Media in the Isolation of Salmonellae from Liquid Egg Products, M. Yde and G. Ghysels, Instituut voor Hygiëne en Epidemiologie, (Departement Microbiologie), J. Wytsmanstraat 14, B-1050 Brussels, Belgium

J. Food Prot. 47:217-219

Ninety-seven samples of raw liquid whole egg and egg yolk were analyzed for the presence of *Salmonella;* 51 samples (52%) were found positive. A comparative study was conducted on the performance of seven selective enrichment procedures in the isolation of *Salmonella* from liquid egg products: selenite-cystine broth incubated at 37°C and 43°C, Muller-Kauffmann tetrathionate broth at 43°C, modified Rappaport medium RIO/100 and RIO/10 also incubated at 43°C, the experimental broth of Greenwood et al. incubated at 37° and 43°C. The best results were obtained with tetrathionate broth which detected 96% of all positive samples. Differences in the rate of isolation by the tetrathionate broth, selenite-cystine broth, modified Rappaport medium RIO/100 and the experimental broth of Greenwood et al., all incubated at 43°C, were not significant as determined by paired χ^2 test. Minor results were obtained with selenite-cystine broth and the experimental broth of Greenwood et al., both incubated at 37°C. Modified Rappaport medium RIO/100 proved to be more efficient than RIO/10.

Microbial Decontamination of Porcine Liver with Lactic Acid and Hot Water, Caspar H. J. Woolthuis, David A. A. Mossel, Jan G. Van Logtestijn, Jan M. De Kruijf and Frans J. M. Smulders, Department of the Science of Food of Animal Origin, Section Hygiene, Faculty of Veterinary Medicine, The University of Utrecht, P.O. Box 80 175, 3508 TD Utrecht, The Netherlands

J. Food Prot. 47:220-226

Because current hygienic practices did not appear to result in bacteriologically fully acceptable porcine livers, the combined effects of decontamination and vacuum packaging on their bacteriological condition were investigated. Livers were taken from freshly slaughtered carcasses, immersed either in a 0.20% (v/v) lactic acid solution for 5 min or in hot water at 65°C for 15 s and subsequently vacuum packed and stored at 3 ± 1°C for 1 or 5 d. As compared with controls, both treatments resulted in significant reductions of total colony counts (TCC at 32°C), *Enterobacteriaceae* CFU-counts (EC at 37°C) and *Lactobacillaceae* CFU-counts (LC at 30°C) both after 1 d and, with the exception of LC in the hot water group, after 5 d of cold storage. Treatment with lactic acid was significantly more effective in reducing TCC and LC on liver surfaces than treatment with hot water. Moreover, lactic acid, but not hot water, improved the bacteriological condition of the inner parts of liver, resulting, after 5 d of storage at 3 ± 1°C, in a significant decrease of TCC and EC; a similar tendency was found for LC. Decontamination resulted in a reduction of the number of genera of *Enterobacteriaceae* as compared with controls. The genus *Escherichia* was isolated most frequently both in control and in treated groups. Slight discoloration of the liver surface was effected by both treatments. It disappeared, however, within 2 h after opening of vacuum packs.

Preparation, Use and Evaluation of Standards Developed for Simultaneous Monitoring of Coulter and Fossomatic Electronic Cell Counting Instruments in Ontario, L. F. Szijarto and D. A. Barnum, Ontario Ministry of Agriculture and Food, Central Milk Testing Laboratory, 240 York Road, Guelph, Ontario N1G 2W1 and Department of Veterinary Microbiology and Immunology, Ontario Veterinary College, University of Guelph, Guelph, Ontario N1G 2W1, Canada

J. Food Prot. 47:227-231

Special standards for Somatic Cell Counting (SCC) were developed at the Central Milk Testing Laboratory in Guelph for Ontario laboratories performing the tests. One laboratory used a Coulter milk counter for composite herd samples, two laboratories used five Fossomatic counters for cow samples, while the fourth used a Coulter counter for research purposes. Standards were prepared at low, medium and high count levels from fresh herd milks containing somatic cells near levels of 100,000, 500,000 and 1,000,000/ml. As the lifespan of the suspensions of somatic cells was three months, they were prepared in sufficient quantities to test daily for 3 months, and to be used throughout the day for calibration maintenance. The actual counts in the standards were established by direct microscopic somatic cell count (DMSCC) performed in two laboratories simultaneously with exchange of slides. Counts were re-confirmed every week by the same DMSCC procedures. The standards are suitable for initial calibration, daily calibration maintenance, daily instrument performance appraisal and trouble-shooting. In daily use each laboratory tests each standard five times each morning on each instrument. The same vials are used throughout the day, every 0.5 h for appraisal of continuous calibration and instrument function. The mean and standard deviations of standards are determined and compiled for each day.

Plant Contamination by PCBs from Amended Soils, Brij L. Sawhney and Lester Hankin, Departments of Soil and Water and Biochemistry and Genetics, The Connecticut Agricultural Experiment Station, Box 1106, New Haven, Connecticut 06504

J. Food Prot. 47:232-236

Plants accumulated PCBs (Aroclors) from soil amended with lake sediment contaminated with Aroclors 1248, 1254, and 1260. Uptake into different parts of vegetable plants was investigated in the field by growing beets (*Beta vulgaris L.*), turnips (*Brassica rapa L.*) and beans (*Phaseolus vulgaris L.*). In beets and turnips, leaves accumulated larger concentrations of PCBs than the roots. In beans, leaves and pods contained higher concentrations than the stems, while only low concentrations were detected in the seeds. Bioaccumulation of Aroclors by plants was in the following order: Aroclor 1248 > 1254 > 1260. Relative to their concentration in the soil, the lower chlorinated PCB isomers which are more soluble in water and more volatile were more abundant in plants then the higher chlorinated isomers.

Effects of Sorbate, Benzoate, Sulfur Dioxide and Temperature on Growth and Patulin Production by *Byssochlamys nivea* in Grape Juice, J. O. Roland, L. R. Beuchat, R. E. Worthington and H. L. Hitchcock, Department of Food Science, Unveristy of Georgia Agricultural Experiment Station, Experiment, Georgia 30212

J. Food Prot. 47:237-241

The influence of potassium sorbate, sodium benzoate, sulfur dioxide (SO_2) and temperature on biomass and patulin production by *Byssochlamys nivea* in grape juice was investigated. Growth of *B. nivea* was monitored over a 25-d incubation period at 21, 30 and 37°C. Approximately 2,500 mg (dry weight) of biomass per 100 ml of juice was obtained in controls at 30 and 37°C; significantly lower amounts were observed at 21°C. Based on concentration, SO_2 had the most significant effect on reducing biomass production followed by potassium sorbate and sodium benzoate, respectively. Patulin was produced in the highest concentrations (10 mg/100 ml) at 21°C after 20 d of incubation. Production was less at 30 and 37°C, with a fairly rapid decrease after reaching a maximum concentration. As in the biomass study, SO_2 had the most significant influence on inhibiting patulin production followed by potassium sorbate and sodium benzoate.

Daminozide and Unsymmetrical Dimethylhydrazine (UDMH) Residues in Fresh and Processed 'Red Delicious' Apples, K. S. Rymal, W. A Dozier, Jr., J. W. Knowles, R. D. Cosper and R. B. Reed, Department of Horticulture and Research Data Analysis, Alabama Agricultural Experiment Station, Auburn University, Auburn, Alabama 36849

J. Food Prot. 47:242-244

Daminozide is a growth regulating substance widely used on apples and other fruit crops to affect various fruit and tree characteristics. Daminozide residues were determined in 'Starkrimson' Red Delicious apples orchard-sprayed at both recommended and excessive rates, at recommended periods before expected harvest, and at several application times closer to harvest than recommended. Analyses were conducted on the whole raw fruit, including the peeling, and on applesauce processed from the peeled and cored fruit, immediately after harvest, and after cold storage periods of 30, 60 and 90 d. Residues in both the fresh and processed fruit were directly proportional to the concentration of daminozide in the foliar sprays, regardless of application date. The highest residues in both fresh and processed apples were in fruit from trees sprayed 14 to 28 d before harvest at all spray concentrations. Residues from all spray concentrations and all application dates were persistent for 90 d at 0°C storage for fresh fruit and at 23°C storage for processed fruit. Only the residues in fruit sprayed with four times the recommended level at 2 or 4 wk before harvest exceeded the U.S. Environmental Protection Agency tolerance level (30 ppm). Residues ranged from <2 to 32 ppm. Unsymmetrical dimethylhydrazine (UDMH) levels were directly proportional to the daminozide residues in the applesauce. Average UDMH residues ranged from 0.03 ppm for fruit sprayed with the recommended rate of daminozide to 0.8 ppm for fruit with the highest daminozide residues.

Associative Growth and Differential Enumeration of *Streptococcus thermophilus* and *Lactobacillus bulgaricus:* A Review, Lyn Radke-Mitchell and W. E. Sandine, Department of Microbiology, Oregon State University, Corvallis, Oregon 97331-3084

J. Food Prot. 47:245-248

The literature which reports on the associative growth properties of *Streptococcus thermophilus* and *Lactobacillus bulgaricus* is reviewed. Also discussed are articles which report on methods to differentially enumerate these two bacteria when they are together either in bulk starters or manufactured products.

Calendar

1984

April 1-3, FOOD INDUSTRY CERTIFICATION/RECERTIFICATION PESTICIDE UPDATE WORKSHOP, Holiday Inn, Harvey, IL. For more information contact: Jean M. Day, Executive Director, Food Sanitation Institute, 1019 Highland Ave., Largo, FL 33540. 813-586-5710.

April 2-3, FOOD TECHNOLOGY CONFERENCE AND SUPPLIER'S EXHIBITION. Breckenridge Concourse Hotel, St. Louis International Airport. Co-sponsored by St. Louis IFT and University of Missouri-Columbia. Contact: Mr. Keith Haffer, The 7-Up Company, 8900 Page Boulevard, St. Louis, MO 63114.

April 2-4, STATISTICAL QUALITY CONTROL SHORT COURSE - Statistical Methods Applied to Productivity Improvement and Quality Control - for the Food Processing Industry. Statistical Methods and Techniques. University of California, Davis. Registration Fee: $180. For further information contact: Robert C. Pearl, Food Science & Technology Dept., University of California, Davis, CA 95616. 916-752-0980.

April 4-6, STATISTICAL QUALITY CONTROL SHORT COURSE - Statistical Methods Applied to Productivity Improvement and Quality Control - for the Food Processing Industry: Application of SQC to the Jobs of Quality. University of California, Davis. Registration Fee: $180. For further information contact: Robert C. Pearl, Food Science & Technology Dept., University of California, Davis, CA. 95616. 916-752-0980.

April 9-11, BIOTECHNOLOGY OF MARINE POLYSACCHARIDES is the topic of the third annual MIT Sea Grant Lecture and Seminar at Massachusetts Institute of Technology, Cambridge, MA. For more information contact: Therese Z. Henderson, MIT Sea Grant Information Center, 77 Massachusetts Ave., Bldg. E38-302, Cambridge, MA 02139. 617-253-7041.

April 9-12, UCD/FDA BETTER PROCESS CONTROL SCHOOL. University of California. Contact: Robert C. Pearl, Department of Food Science & Technology, University of California, Davis, CA 95616. 916-752-0980.

April 12, CHEMICAL ASPECTS OF FOOD SAFETY ONE DAY WORKSHOP by the Eastern Regional Reseach Center, U.S. Dept. of Agriculture, 600 E. Mermaid Lane, Philadelphia, PA 19118. For more information contact: Arthur Miller, 215-233-6525. April 16-18, MIAMI INTERNATIONAL SYMPOSIUM ON THE BIOSPHERE. For more information contact: Ms. Grace Mayfield, Miami International Conference on the Biosphere, Clean Energy Research Institute, University of Miami, PO Box 248294, Coral Gables, FL 33124.

April 16-18, CONFERENCE OF THE MISSOURI MILK, FOOD AND ENVIRONMENTAL HEALTH ASSOCIATION, Ramada Inn, Columbia, MO. For more information contact: Dr. J. E. Edmondson, 201 Eckles Hall, Dept. of Food Science and Nutrition, Columbia, MO 65211. 314-882-2630.

April 17, THE IOWA ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC. ANNUAL MEETING will be held at the Howard Johnson's in Cedar Falls. For more information contact: Karen Scherer, 624 N. Chestnut, Monticello, Iowa 52310. 319-465-4423.

April 18-19, THE JOINT ANNUAL MEETING OF THE AMERICAN DRY MILK INSTITUTE AND THE WHEY PRODUCTS INSTITUTE will be held at the Chicago Marriott O'Hare Hotel, 8535 West Higgins Road, Chicago, IL. For more information contact: Dr. Warren S. Clark, Jr., Exec. Dir., 130 N. Franklin St., Chicago, IL 60606.

April 24-25, FAMFES ANNUAL EDUCATIONAL CONFERENCE, Cypress Gardens Quality Inn, Cypress Gardens, FL. For more information contact: Franklin W. Barber, 1584 Cumberland Ct., Ft. Meyers, FL 33907.

April 25, SOUTHERN CALIFORNIA FOOD PROCESORS SANITATION WORKSHOP FOR THE FOOD PROCESSING AND FOOD SERVICE INDUSTRIES. Presented by the University of California Cooperative Extension with assistance from industry trade associations and food industry personnel. Inn at the Park, Anaheim, Ca. For more information contact: Paulette De Jong, Food Science and Technology, University of California, Davis, CA 95616. 916-752-1478.

April 25-27, WORKSHOP II IN FOOD FLAVOR: A HANDS ON COURSE IN FLAVOR APPLICATIONS. For more information contact: G. Reineccius, Dept. of Food Science and Nutrition, University of MN, 1334 Eckles Avenue, St. Paul, MN 55108.

April 30-May 3, ASEPTIC PROCESSING AND PACKAGING WORKSHOP, For more information contact: Dr. James V. Chambers, Purdue University, Dept. of Food Science, West Lafayette, IN 47907. 317-494-8279.

May 2-4, SOUTH DAKOTA ENVIRONMENTAL HEALTH ASSOCIATION ANNUAL MEETING. Staurolite Inn, South Dakota State University, Brookings, SD. For more information contact: Morris V. Forsting, Secretary-Treasurer, 1320 S. Minnesota Ave., Room 101, Sioux Falls, SD 57105.

May 2-4, AMERICAN ASSOCIATION OF CEREAL CHEMISTS (AACC) 14TH ANNUAL SPRING TECHNICAL CONFERENCE of its Milling and Baking Division. To be held at the Marriott Hotel in Omaha, Nebraska. For more information contact: Joseph V. Nigro, Conagra, Inc., 1521 North 16th Street, Omaha, Nebraska 68110. 402-399-9000.

May 6-11, FOOD SANITATION INSTITUTE EXECUTIVE LEADERSHIP INSTITUTE IN ENVIRONMENTAL SERVICES MANAGEMENT, University of Illinois, Champagne, IL. For more information contact: Jean M. Day, Executive Director, Food Sanitation Institute, 1019 Highland Ave., Largo, FL 33540. 813-586-5710.

May 7-11, AN INTRODUCTION TO THE SENSORY EVALUATION OF FOOD: EXPERIMENTAL METHODS AND STATISTICAL ANALYSIS is a 5-day course for beginning sensory scientists. To be held at the University of California - Davis. For more information contact: Michael O'Mahony, Department of Food Science & Technology, UC Davis, Davis, CA 95616. 916-752-0980.

May 7-11, INTERNATIONAL MILK PROTEIN CONGRESS. For more information contact: International Milk Protein Congress, Congress Secretariat, PO Box 399, 5201 AJ's-Hertogenbosch, The Netherlands.

May 9-11, NATIONAL CONFERENCE FOR FOOD PROTECTION, Hyatt Regency Crystal City, Arlington, VA. For more information contact: Charles W. Felix, 1025 Connecticut Ave., NW, Suite 1015, Washington, DC 20036. 202-347-0020.

May 14-16, SEMINAR ON FERMENTED MILK, International Dairy Federation, Avignon, France. For more information contact: Harold Wainess, Secretary U. S. National Committee of the IDF (USNAC), 464 Central Avenue, Northfield, IL 60093. 312-446-2402.

May 14-17, INTRODUCTION TO CEREAL CHEMISTRY AND TECHNOLOGY, a 12th annual AACC short course. To be held at the Marriott Hotel in Bloomington, Minnesota. For more information contact: Raymond J. Tarleton, AACC Headquarters, 3340 Pilot Knob Road, St. Paul, MN 55121. 612-454-7250.

May 15-17, SANITATION - BACK TO BASICS II, Food Sanitation Institute Western Regional Educational Conference, Oakland Airport Hilton, Oakland, CA. For more information contact: Jean M. Day, Executive Director, Food Sanitation Institute, 1019 Highland Ave., Largo, FL 33540. 813-586-5710.

May 19-23, 65TH NRA RESTAURANT, HOTEL-MOTEL SHOW, Chicago's McCormick Place. For more information contact: Jeffrey R. Prince, Senior Director, 800-424-5156 or 202-638-6100.

May 21-23, PREVENTIVE SANITATION AND FOOD & DRUG COMPLIANCE WORKSHOP including EPA/FIFRA and Pesticide Updates seminar to be held in St. Louis, MO, Holiday Inn - Riverfront by the Huge' Company, Inc. and its division, the American Sanitation Institute. For more information call 800-325-3371. In Missouri call 800-392-0855 or 314-725-2555.

May 27-30, THE CANADIAN INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY'S

27TH ANNUAL CONFERENCE. Hyatt Regency Vancouver Hotel, 655 Burrard St., Vancouver, B.C. 604-687-6543. For more information contact: Jerry Heddinger, Publicity Chairman, Qwest Food Ltd., 260 E. 5th Ave., Vancouver, B.C. V5T 1H3. 604-873-2647.

June 3-6, BBEX (British Baker International Baking Exhibition). At the Conference and Exhibition Centre, Harrogate, England. For more information contact: Tom Webb, British Trade Development Office, 212-593-2258.

June 10-14, 50th ANNUAL EDUCATIONAL CONFERENCE of the Canadian Institute of Public Health Inspectors. For more information contact: J. Dunlop, CPHI (C), 1984 National Educational Conference Committee, Canadian Institute of Public Health Inspectors, 444 Sixth St., N.E., Medicine Hat, Alberta, Canada T1A 5P1.

June 11-12, TEXAS ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS ANNUAL MEETING. For more information contact: Clair Gothard, 1115 North MacGregor, Houston, TX 77030.

June 11-13, TECHNICAL SESSIONS AND EXHIBITS, Association of Official Analytical Chemists, Leamington Hotel, Minneapolis, MN. For more information contact: Raymond H. Bowers, General Mills, Inc., 9000 Plymouth Ave. N., Minneapolis, MN 55427.

June 24-27, NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION'S ANNUAL EDUCATIONAL CONFERENCE to be held in Grand Rapids, MI. For more information contact: NEHA, 1200 Lincoln, #704 Denver, CO 80203. 303-861-9090.

July 14-21, WORKSHOP ON RAPID METHODS AND AUTOMATION IN MICROBIOLOGY, at Kansas State University, Manhatten, KS. Dr. Daniel Fung, Dr. Nelson A. Cox and Dr. Millicent C. Goldschmidt will present lectures. The course will carry 7.2 Continuing Education Credits for the American Society for Microbiology. For more information contact: Dr. Daniel Fung, Call Hall, Kansas State University, Manhattan, KS 66506. 913-532-5654.

July 29-August 2, 24TH ANNUAL MEETING OF THE HOSPITAL, INSTITUTION AND EDUCATIONAL FOOD SERVICE SOCIETY (HIEFSS), at the Riviera Hotel and Convention Center in Las Vegas, Nevada. The HIEFSS Expo '84 will be open on July 31 and August 1. For more information contact: Carolyn Isch, Asst. Exec. Dir., HIEFSS 4410 W. Roosevelt Rd., Hillside, IL 60162. 800-323-1908 or 312-440-2770.

Aug. 5-9, IAMFES ANNUAL MEETING, Edmonton Inn, Edmonton, Alberta, Canada. For more information contact: Peggy Marce, Alberta Association of Milk, Food & Environmental Sanitarians, PO Box 8446, Station F, Edmonton, Alberta, Canada T6H 5H3 or call IAMFES at 515-232-6699.

August 6-10, BIOTECHNOLOGY: MICROBIAL PRINCIPLES AND PROCESSES FOR FUELS, CHEMICALS AND INGREDIENTS, a Massachusetts Institute of Technology one week course. For more information contact: Director of Summer Session, MIT, Room E19-356, Cambridge, MA 02139.

September 12-13, The FIFTH ANNUAL JOINT EDUCATIONAL CONFERENCE of the Wisconsin Association of Milk and Food Sanitarians, the Wisconsin Environmental Health Association, The Wisconsin Dairy Technology Society and the Wisconsin Association of Dairy Plant Field Representatives will be held at the Stevens Point Holiday Inn and Holidome Indoor Recreation Center. For more information contact: Ron Buege, West Allis Health Department, 7120 West National Ave., West Allis, WI 53214. 414-476-3770.

September 15-21, 68th ANNUAL SESSIONS OF THE INTERNATIONAL DAIRY FEDERATION, Prague, Czechoslovakia. For more information contact: Harold Wainess, Secretary U. S. National Committee of the IDF (USNAC), 464 Central Avenue, Northfield, IL 60093. 312-446-2402.

September 20-21, MINNESOTA SANITARIANS ASSOCIATION, INC. ANNUAL MEETING to be held at the Earl Brown Center for Continuing Education on the St. Paul Campus of the University of Minnesota. For more information contact: C. B. Schneider, President, Minnesota Sanitarians Association, Inc. 612-623-5335.

September 30-October 4, 69TH ANNUAL MEETING OF THE AMERICAN ASSOCIATION OF CEREAL CHEMISTS to be held at the Hyatt Regency and Amfac Hotels in Minneapolis, MN. For more information contact: Raymond J. Tarleton, AACC Headquarters, 3340 Pilot Knob Road, St. Paul, MN 55121. 612-454-7250.

October 9-10, DAIRY INDUSTRY CONFERENCE, Hyatt/Long Beach, Long Beach, CA. For more information contact: John C. Bruhn or Shirley Rexroat, Dept. of Food Science & Technology, University of California, Davis, CA 95616. 916-752-2191.

October 15-17, ISSUES IN SENSORY EVALUATION - STABILITY AND QUALITY CONTROL - Palo Alto, California. Attendence is limited and there is a fee. For more information and registration contact: Tragon Corporation, 750 Welch Road, Suite 210, Palo Alto, CA 94304.

October 19-25, FOOD SANITATION INSTITUTE 27TH ANNUAL NATIONAL EDUCATIONAL CONFERENCE & EXPOSITION, Holiday Inn Surfside, Clearwater Beach, FL. For more information contact: Jean M. Day, Executive Director, Food Sanitation Institute, 1019 Highland Ave., Largo, FL 33540. 813-586-5710.

November 22-24, 14TH ANNUAL SYMPOSIUM ON THE ANALYTICAL CHEMISTRY OF POLLUTANTS, 3rd International Congress on Analytical Techniques on Environmental Chemistry-Expoquimia, Barcelona, Spain. For more information contact: Av. Reina Ma. Christina Palacio No. 1, Barcelona-4 Spain.

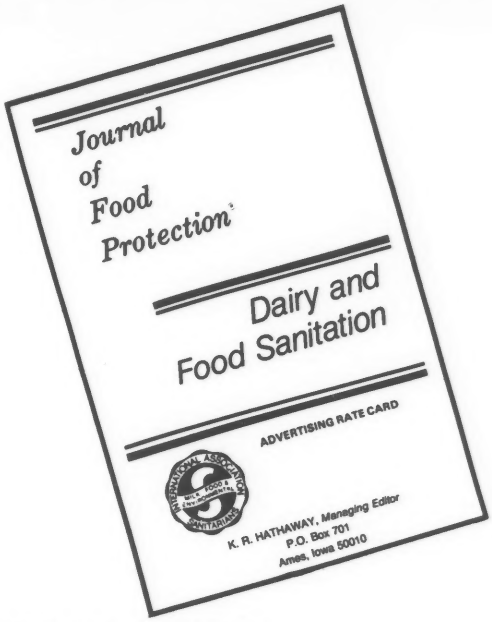
1985

May 20-23, FOODANZA '85, joint convention of the Australian and New Zealand Institutes of Food Science and Technology. To be held at the University of Canterbury, Christchurch, New Zealand. For more information contact: D. R. Hayes, Convention Secretary, 394-410 Blenheim Road, PO Box 6010, Christchurch, New Zealand.

August 25-30, 9TH SYMPOSIUM OF WAVFH. The World Association of Veterinary Food Hygienists (WAVFH) will hold their 9th Symposium in Budapest, Hungary. For more information contact: 9th WAVFH Symposium, Organizing Commitee, Mester u. 81, H-1453 Budapest Pf 13, Hungary.

1986

May 26-31, 2ND WORLD CONGRESS FOODBORNE INFECTIONS AND INTOXICATIONS will take place in Berlin (West) at the International Congress Centre (ICC). For more information contact: FAO/WHO Collaborating Centre for Research and Training in Food Hygiene and Zoonoses, Institute of Veterinary Medicine (Robert von Ostertag-Institute), Thielallee 88-92, D-1000 Berlin 33.



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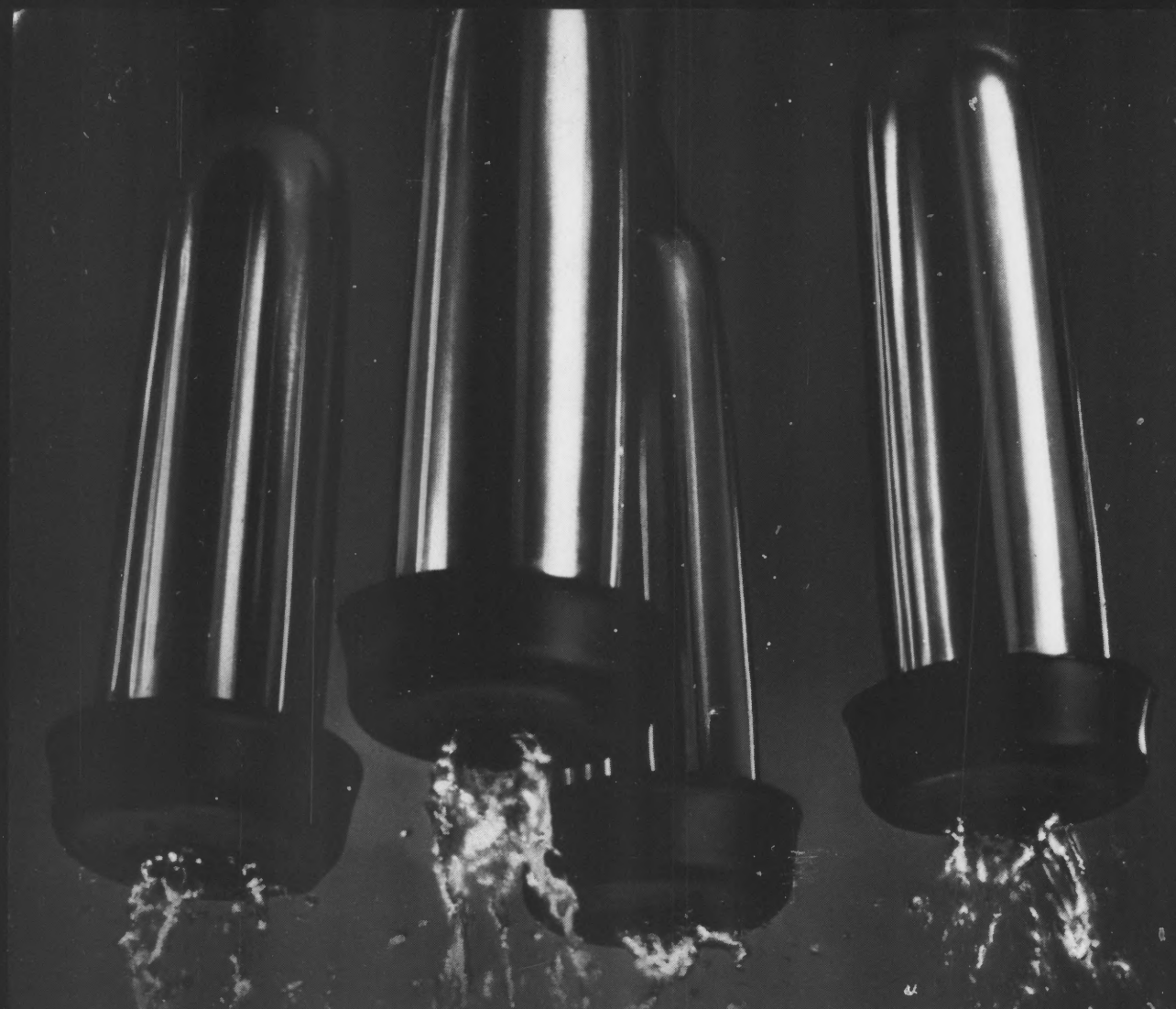

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